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South Australia.

A REVIEW

OF

MINING OPERATIONS

IN THE

STATE OF SOUTH AUSTRALIA

DURING THE

HALF-YEAR ENDED DECEMBER 31st, 1911.

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Compiled by LIONEL C. E. GEE, Chief Registrar and Recorder, Department of Mines,

UNDER THE AUTHORITY OF THE

HONORABLE RICHARD BUTLER, M.P.,

Minister of Mines.

ISSUED BY F. C. WARD, *Acting Secretary for Mines.*

DEPARTMENT OF GEOLOGICAL SCIENCES
UNIVERSITY OF TORONTO

Adelaide:

R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1912.

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Miners' Rights and Privileges thereunder.

A miner's right is obtainable at the Department of Mines, Adelaide, also at the issuing stations in the various mining districts, at a cost of 5s.

A miner's right is in force for one year from the date of issue, and may be renewed at any time during its currency for another term of one year on payment of 5s.

The holder of a miner's right is authorised to prospect on any mineral lands for any metal, mineral, coal, or oil, and to peg out (of the prescribed shape and dimensions) gold, mineral, coal, and oil claims, and also leases of a like nature.

AREAS AND WORKING CONDITIONS.

GOLD LEASES—Maximum area, 20 acres; working conditions, one man to every five acres.

MINERAL LEASES—40 acres; one man to every 10 acres.

MISCELLANEOUS LEASES—

Salt	640	acres;	special conditions.
Gypsum	640	"	one man to every 40 acres.
Mining Works	10	"	one man.
COAL OR OIL LEASES	640	"	one man to every 40 acres.
GOLD DREDGING LEASES	200	"	special conditions.
MINERAL CLAIMS	40	"	
GOLD CLAIMS	30ft. x 30ft., alluvial; 100ft. x 600ft., reef.		

Gold claims must be constantly worked—one man for each claim—and mineral claimholders must employ two men for each claim. Amalgamation of either gold or mineral claims reduces the labor conditions by one-half.

Gold, mineral, coal, and oil leases are granted for a term of 42 years—the two former at a rental of 1s. per acre per annum and a royalty of 6d. in the pound on net profits, the latter at a rental of 6d. per acre per annum until coal or oil is found in payable quantities, when 1s. per acre is payable and a royalty of 6d. in the pound on the net profits.

The Minister may permit, for the concentration of labor, of the amalgamation of not more than four adjoining gold or mineral leases.

Any number of gold, mineral, coal, or oil leases may be held by one person.

Licences to search for twelve months for precious stones, mineral phosphates, oil, rare metals, minerals, and earths are issued on specific mineral lands, not exceeding five square miles in area for one person, a fee of 20s. being charged for each square mile or portion thereof. These licences give a preferential right to a lease over a portion of the area, as prescribed.

PREFACE.

The average price of "Standard" copper for the six months is £57 1s. 3d. per ton, being £1 19s. 0d. higher than that of the preceding six months.

A satisfactory rise in the copper market took place in December; this bids fair to be maintained, and we may reasonably look forward to a renewal of activity in South Australian copper mining.

As much public interest is manifested in connection with the rare radio-active ores which occur in this State, a special bulletin giving all available details concerning them was published in October last. Developments in the field, and also researches into the question of the economic values of these discoveries, are both making good progress.

LIONEL C. E. GEE,

Chief Registrar and Recorder, Department of Mines.

February 20th, 1912.

INDEX.

PAGE.

Accidents, Mines and Quarries 20
Area held under Mining Acts 5
Assistant Government Geologist 11

Battery and Cyanide Returns 13
Beltana Rapid Ore Treatment Syndicate 7, 25
Bingo 7
Blinman 8
Boring Operations 15
Bottrill Motor Tractor 7
Boomerang G. M. 23
Bonnie Keith G. M. 23
Brown, H. Y. L. 10

Calcookra C. M. 25
Cornwall C. M. 7, 24
Commonwealth (Wheal Ellen) 9, 14
Copper, Average Prices of 6, 12
Copperlinka G. M. 24
Copper Queen 25
Coronation Wolfram Blocks 36
Crushing and Cyaniding Plants 12

Decennial Returns 21
Deloraine 8, 26
Deloraine Blocks 26
Dorothy Tin Show 34
Dustholes 9, 26

General Notes 6
Glenloth Government Plant 13
Government Geologist 10
Golden Gate 27
Golden Record 28
Great Eastern G. M. 27

Homeward Bound 8, 28

Jack, R. Lockhart 11
John Snell's Copper Mine 28

Kapunda 8
Kitticoola 8, 28
King's Bluff 9, 14, 28
Kirkcek's Treasure 14, 29
Koolka Iron Ore 9

Lady Mary C. M. 29
Leigh Creek 8
Lyndhurst Co. 7
Lykke Viking (Teetulpa) 29

Men Employed 5
Mining Operations for Half-year 5

PAGE.

Miltalie 30
Moonta and Wallaroo 6
Montacute 8
Mount Grainger 9, 14, 31
Mount Gunson 7
Mount Hecla Co. 8
Mount Hecla West 7
Mount Lyell Consols, Wallaroo Copper Mines 7
Mount Torrens Government Plant 13
Mutooroo 8

New Milo 33
North-East Matta 7

Paramatta and Yelta 22
Perseverance (Tarcoola) 9
Petersburg Government Plant 12

Queen May G. M. 33

Radium Extraction Co. of South Australia 9
Radium Hill 9, 33
Radium Hill South 34
Radium Hill North 33
Rapid Bay, Boring at 15
Ruby Oxide 34

Salt—Estimated Production, 1911 21
Subsidies 18
Scotchman and Ironclad (Teetulpa) 29

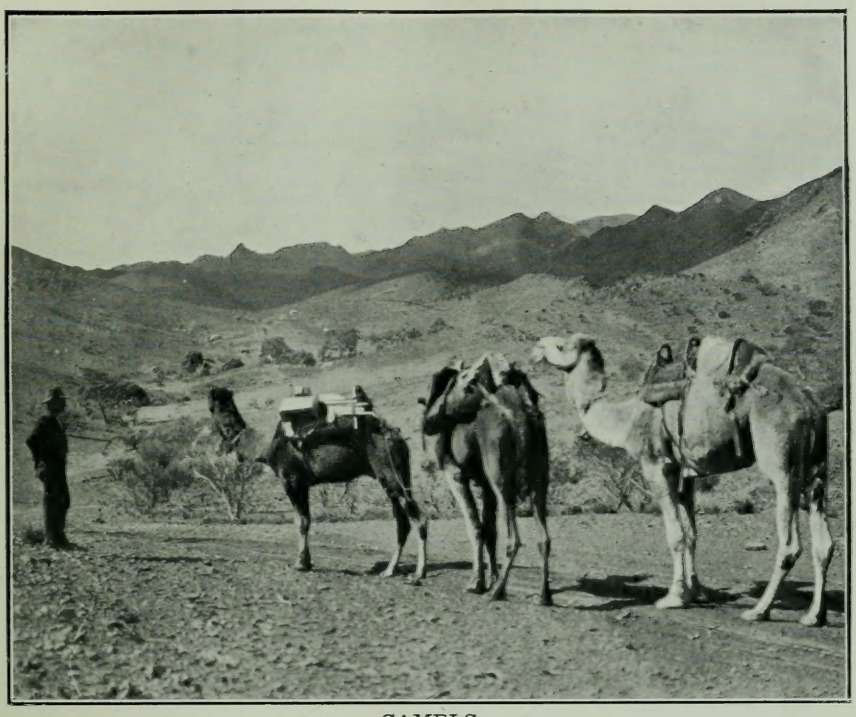
Tarcoola Perseverance 9
Tarcoola Government Plant 13
Tarcoola Blocks 14
Union Consolidated 7
Uncle Tom S. L. 35

Virginia G. M. 34

Wallaroo and Moonta 6
Wallaroo Central 7
Wallaroo Extended 7, 15
Wadnaminga 9
Wandilta 16, 35
Ward, L. Keith 10
Warra Warra 7
Westward Ho 8, 36
Wheal Ellen 9, 14
Wolfram 9, 36
Woodside Gold Mines 8

Yelta and Parramatta 9

TWO MODES OF PROSPECTING.



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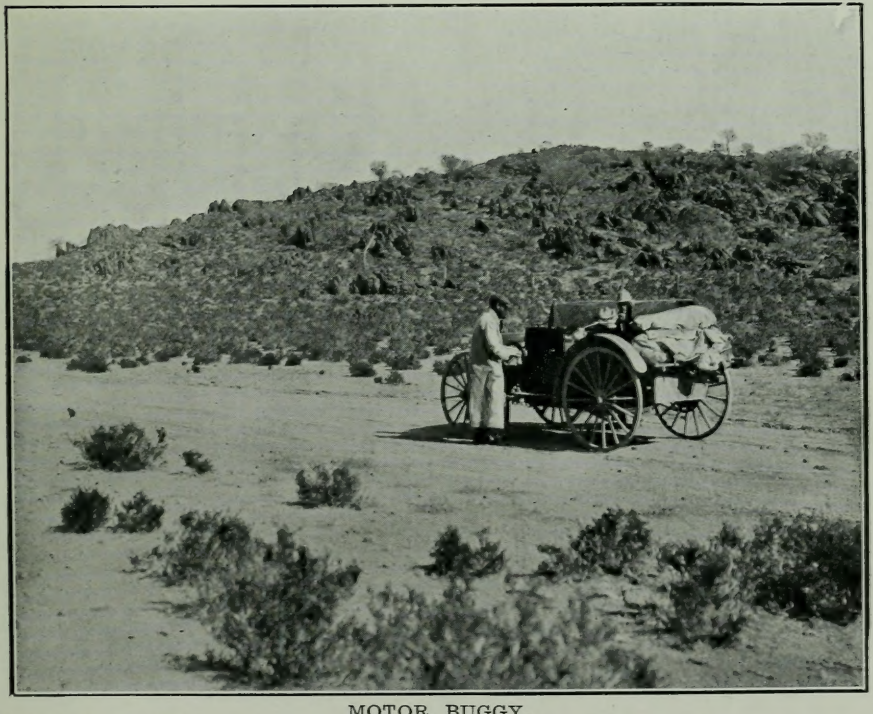

MOTOR BUGGY.

Photos. by Dr. Douglas Mawson.]

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Mining Operations during the Half-year ended December 31st, 1911.

AREA AT PRESENT HELD UNDER MINING ACTS (DEC. 31ST, 1911).

Nature of Holding.	Number.	Area.
Mineral leases	258	13,139 acres
Gold leases	80	1,500 "
Gold dredging leases	—	— "
Miscellaneous leases	41	8,000 "
Mineral claims	320	10,500 "
Occupation licences	212	106 "
Search licences	50	52,620 "
Coal claims	5	3,200 "
Gold claims	5	12 "
Total holdings	971	89,077 acres

REGISTERED FROM JUNE 30TH, 1911, TO DECEMBER 31ST, 1911.

Mineral claims	88	3,500 acres
Gold leases	6	120 "
Mineral leases	20	760 "
Miscellaneous leases	2	498 "
Miners' rights	304	—
Search licences	21	21,760 "
Coal and oil claims	—	—
Gold claims	—	—
Total	441	26,638 acres

MEN EMPLOYED.

Estimated number of men employed in mining and mineral works, December 31st, 1911 :—

Copper	4,030
Gold	920
Salt	470
Silver-lead	30
Other minerals	550
Total	6,000

GENERAL NOTES.

The average price per ton of standard copper for the six months is £57 1s. 3d., and the range of prices—lowest, September 9th. £54 8s. 9d.; highest, December 29th, £63 16s. 3d. The average for the year 1911 is £56 1s. 10d., and for the ten years 1902-11, £63 12s. 3d.

The average price for the preceding six months is £55 2s. 3d.; but in the last number of this Review it is stated, "Hopeful feelings in regard to the future of the copper market are, however, not lacking, and there is a strong idea amongst mining men generally that the time of better prices will not be long in coming."

Events have proved that these hopeful feelings were justified, and the year closed with the average price for the month of December at £61 4s. 0d. (the quotation for December 29th being £63 16s. 3d.), which is the highest monthly average since January, 1909.

The opinion arrived at by *The London Statist* in a long and interesting article, dealing with the decreasing copper stocks and the increasing demand for the red metal, published in October last, may be summed up in the concluding paragraph—"While we deprecate, and do not look for any boom in the market prices of copper, we shall be surprised if there is not a steady to stiff market."

Reporting more recently, Messrs. Henry Merton & Co., Ltd., the well known authorities in connection with the sale and distribution of copper, say:—"In surveying the copper situation it is, however, essential also to take into consideration the prospects of consumption and production in the near future. While it is no very difficult matter to estimate the possibilities of production, the means of arriving at the prospective requirements of the world are not available; but, judging from the present state of manufacturers' order books, it is safe to say that for the next six months the copper consumption in Europe will be maintained at the present record rate, while in America, where it has been below the normal, it is likely to improve. As regards production, it will probably be found that the world's output during 1911 was scarcely larger than that of the preceding year. During 1912 there may be an increase of 60,000 to 80,000 tons from North and South America, and small increases from Australia, Russia, and perhaps Central Africa. These extra supplies will be fully required by the trade during this year unless a serious falling off in consumption were to take place in the latter part of 1912, a contingency which is scarcely to be expected with the continued rapid development in the electrical industry."

A revival in the South Australian copper mining industry may be looked for, and it is hoped that many mines and mining shows now abandoned or only worked intermittently will soon be in full swing again.

At the *Moonta Mines* 13,771 tons were broken and 11,931 tons of 4·08 per cent. ore treated. At *Wallaroo Mines* 56,600 tons broken, and 54,647 tons of 3·73 per cent. ore treated.

Reports on the *Yelta and Paramatta* and the *Wandilta* will be found on pages 22, 16, and 35.

The *Wallaroo Central*, formerly known as the *Bingo Mine*, has been taken over by a new company formed and registered in Melbourne as the *Mount Lyell Consols Wallaroo Copper Mines*. Reports giving details of the bores sunk by the Government drill on this property will be found at page 299 of the Record of Mines.

At the *Wallaroo Extended* the Government drill is at work. Details of the boring operations up to the end of the half-year will be found on page 15.

At the *Cornwall Mine*, situated south of the Wandilta, contracts have been let to the Goldfield Diamond Drilling Co., of Melbourne, for testing the country by bores. Information concerning this mine, which was also called *The Wallaroo East*, will be found at page 46, Record of Mines, and a recent report by Inspector Jones at page 24.

A little work has been done at the *North-East Matta*, and 100 tons of lode material raised.

The Union Consolidated and the *Lyndhurst* Co.'s holdings near Yudnamutana are under suspension. A new company to take over all the properties has been formed, and a scheme of reconstruction submitted to the shareholders. Recent London advices state that the success of this amalgamation scheme is practically assured.

The Beltana Rapid Ore Treatment Syndicate has extended its shaft and continues the erection of the plant.

The *Warra Warra* mine has been unworked for some time owing to the previous dry conditions of the country and the low price of copper Operations are now being resumed.

Work has not yet been restarted on the large bodies of low-grade ore at *Mount Gunson*. Some interesting pictures of the Bottrill motor tractor recently imported by the Mount Gunson Co. have been obtained from Mr. Marshall, the manager, and are reproduced in this Review.

The tractor left Port Augusta West on November 25th, with 32 tons of loading for Gibson's Camp and Oakden Hills. The mine was reached on December 6th. The actual travelling over this 90-mile journey occupied 109 hours. When working in perfect order, the tractor travelled at the rate of from $1\frac{1}{2}$ to $1\frac{3}{4}$ miles an hour. The return journey with empty wagon was begun on December 10th, and occupied $7\frac{1}{2}$ days of from 9 to 10 hours each. The wagon and engine frame comfortably held the 32 tons of loading. The track between Port Augusta West and Mount Gunson is over level sandy country, occasional sandhills, and stony tablelands. The work done on the trip was superior to anything done before by mechanical carrying contrivances over this class of country.

From the *Mount Hecla West*, in the North-Eastern district, 150 tons of copper ore, roughly sampled at 9 per cent., have been raised.

Little work has been done at the various copper shows in the *Leigh Creek* district beyond picking over old ore dumps and prospecting.

Work has been restarted at the *Montacute*, situated about 10 miles N.E. of Adelaide. This mine is one of the oldest in the State, having been discovered in 1843-4, when the ores found were chiefly yellow and peacock, averaging 18 per cent. In 1848 the quantity of ore raised was about 15,000 tons, the quantity shipped about 1,000 tons, and the highest price realised in Swansea about £18 per ton. Work was stopped by the discovery of the Victorian goldfields in 1851 withdrawing all the miners. It has been stated that assays showing gold up to 4ozs. 13dwts. 8grs. per ton were obtained. The mine was worked again for a time in 1898-9, some tunnels being driven in from the N. side of the spur. It is to be hoped that the present venture will prove successful.

Mutooroo.—A little work is in progress here, tributing in carbonate ore and treating the mine water by precipitation.

No work has been done at the *Kapunda* Mine.

The men working at the old stopes in the *Blinman* Mine have marketed 68½ tons of 20 per cent. ore.

The *Westward Ho!* has been restarted by the Mount Hecla Company, and it is anticipated that the very large ore body which exists at this place will give profitable results A considerable amount of information concerning this interesting mine will be found in the Record of Mines, p.p. 244 and 247.

At the *Kitticoola* the erection has been completed of a gas suction engine, and also five more head of 1,000lb. stamps, making 10 in all. The mining work in progress is underhand stoping below 180ft., and rising, stoping, and driving above hat level.

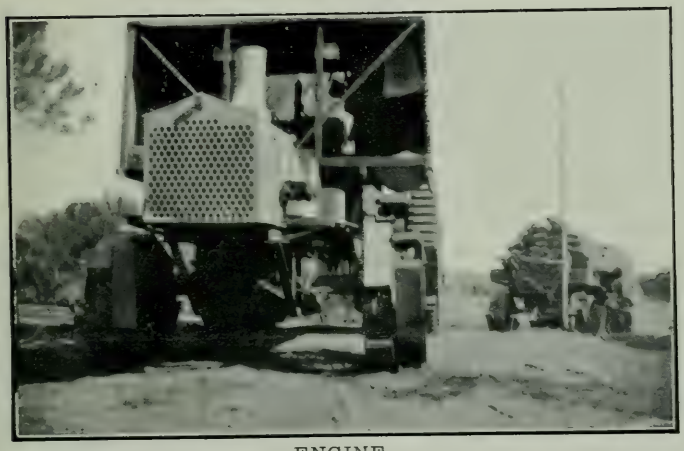
Nothing has been done at the *Woodside Gold Mines;* but it is stated that the whole of the properties controlled by the company are under the consideration of a syndicate, and that there is a probability of business resulting.

From the *Deloraine* 8½ tons of ore have been treated for 93¾ozs. of gold and 7cwts. of copper. The work done on the mine consists of shaft sinking, driving, crosscutting, and the erection of buildings and machinery.

From the *Homeward Bound* 18 tons 8cwts. of stone gave 33ozs. 8dwts. 22grs. of gold, valued at £136 6s. 3d.

The Bottrill Motor Tractor Purchased by the Mount Gunson Company.

EN ROUTE.



ENGINE.

WAGON.

Photos. by Mr. Marshall.

The old *Wheal Ellen* Mine closed down once more on October 19th, and the Commonwealth Silver and Lead Co. went into liquidation.

At the *Tarcoola Perseverance*, from which during last half-year 105 tons of ore yielded 452½ozs. of gold, 115 tons of stone have been raised and not yet treated.*

The sinking of the vertical shaft continues at *King's Bluff*. (*Vide* Inspector's report, page 28.)

Ten tons from the *Dustholes* returned 16ozs. 15dwts. 8grs. of gold, valued at £59 11s. 8d. A further report on this property by Inspector Jones will be found on page 26.

There are signs of activity at *Wadnaminga*. Four small parcels from various blocks there, totalling 22½ tons., treated at the Petersburg Government plant yielded 21½ozs. of gold, valued at £78 2s. 1d

---

Mount Grainger.—A parcel of 470 tons crushed at the mine gave about 3dwts. per ton by battery treatment, and the work of installing vats, &c., for secondary treatment is in progress. A detail report on this mine and its prospects, which appear to the Inspector most promising, is given on page 31.

The production of *Wolfram* ore from Callawonga Creek has amounted to 1 ton 16cwts., worth £144.

The manager of the *Radium Extraction Co. of S.A.*, in connection with the operations at *Mount Painter*, reports that developmental work has been carried out on uranium radium ores at seven different points, at all of which the location of radio-active ore has been successful. Developmental work is also being carried out on the corundum workings to locate the lode from which the good slugs of clean corundum found on the surface must have migrated.

Radium Hill Company.—In the Olary district, 12 miles S. from Cutana. The work of sinking and driving is in progress here; the magnetic separator plant is also in course of erection, and it is expected that regular supplies of concentrates will shortly be forwarded to the works near Sydney.

Other prospecting companies and syndicates are at work in both the Mount Painter and Olary districts; and, although prospects generally seem to be very encouraging, no finds of importance have yet been reported.

Samples were recently taken from the two ironstone "blows" or deposits known as *Koolka*, and situated about 10 miles north of Bimbowrie Station. A sample was also obtained from a large ferruginous outcrop which traverses the hills in the vicinity

* This parcel on treatment yielded 438ozs. 15dwts. of gold, valued at £1,705 0s. 9d.

of Bimbowrie Station for a considerable distance. These were analysed at the School of Mines with the following results :—

Description.	No. 1, Koolka. Hematite.	No. 2. Koolka. Hematite.	No. 3, Bimbowrie. Ferruginous rhodonite, pyrolusite, &c.
Water at 100° C.	0·04 per cent.	0·15 per cent.	0·27 per cent.
Water at red heat	1·61 "	2·15 "	2·48 "
Silica	1·70 "	2·43 "	30·50 "
*Ferric oxide	86·51 "	88·30 "	14·49 "
*Ferrous oxide	8·90 "	2·59 "	nil
Alumina	1·70 "	2·78 "	11·34 "
Lime	0·15 "	—	3·14 "
Magnesia	—	—	1·88 "
Sulphur	0·05 per cent.	0·06 per cent.	0·04 "
Phosphoric acid	0·29 "	1·08 "	0·30 "
Titanic dioxide	nil	0 72 "	1·73 "
Carbon dioxide	—	—	0·88 "
Manganous oxide	trace	trace	19·13 "
Manganese dioxide	—	—	12·02 "
Soda	—	—	1·30 "
Potash	—	—	1·10 "
	100·95 per cent.	100·26 per cent.	100·60 per cent.
*Containing iron	67·47 per cent.	63·82 per cent.	10·14 per cent.

Mr. H. Y. L. Brown, F.G.S., who has occupied the post of Government Geologist since 1882, retired from the service at the end of the year, much to the regret of the Government and the public.

Mr. Brown's reputation in his profession is world wide, and he possesses the confidence of the mining public to a quite unique degree.

He made many long and exceedingly rough trips, and in his work of laying down the main geological features of the country he practically traversed the whole of South Australia and the Northern Territory, from the Arafura Sea in the north to the Southern Ocean in the south, and from the borders of Queensland, New South Wales, and Victoria on the east to the boundary of West Australia on the west.

As a mark of respect on his retirement from active duty he was asked to accept the appointment of Honorary Consulting Geologist for the State, and he agreed to do so.

Mr. Leonard Keith Ward, B.A., B.E., Assistant Government Geologist and Inspector of Mines for Tasmania, was appointed Government Geologist in succession to Mr. Brown.

Mr. Ward entered the Sydney University as Queensland Government Exhibitioner in 1897, and, after passing through the Arts course, entered the School of Engineering in the departments of Mining and Metallurgy, whence he graduated in 1903.

He then spent some time at Broken Hill in the employ of the Proprietary Company, and later joined the staff of the West Australian School of Mines as lecturer in geological subjects, in which position he remained for four years, when he received the Tasmanian appointment.

For the four and a half years during which he held this position his main work consisted in the geological investigation and mapping of the western mineral fields and the exploration of that portion of the State lying between Mount Lyell and Hobart.

Mr. Ward has also a general personal knowledge of most of the leading mining fields of Australia.

Mr. Robert Lockhart Jack, B.E., F.G.S., A.I.M.M., was appointed Assistant Government Geologist.

He is a son of the well-known scientist Dr. R. Logan Jack, for many years Government Geologist of Queensland, and took the degree of Bachelor of Engineering in Mining with honors at the Sydney University in 1899. Went to London in 1899, and during 1900 and 1901 was a member of an expedition sent to Korea and Western China to report as to their mineral possibilities.

Until 1903 was in London with Dr. R. Logan Jack, in practice as mining engineers and geologists, and had frequent opportunities of seeing continental mining practice.

In 1903 left for the Eastern Transvaal, and spent six months reporting on properties held under option for gold.

In 1904 assisted Dr. Jack, Royal Commissioner on the Collie Coalfield, inquiring into the geological and commercial problems of the field.

Until 1906 was in practice in Western Australia, and professionally visited several mining districts; and from 1906 to December, 1911, when he received the present appointment, was Geologist and Assistant Surveyor to the Golden Horseshoe Estates Company, Limited, Boulder.

COPPER.

AVERAGE MONTHLY PRICE OF COPPER, JULY TO DECEMBER, 1911.

	Standard. £	s.	d.		Best Selected £	s.	d.
July	56	15	6	..	60	4	4
August	56	7	6	..	60	4	0
September	55	7	1	..	58	17	3
October	55	5	3	..	58	17	3
November	57	8	4	..	60	18	5
December	61	4	0	..	65	5	7
Average for the six months	57	1	3	..	60	14	5

RANGE OF PRICES—

September 9th	54	8	9
December 29th	63	16	3

AVERAGE PRICE OF STANDARD COPPER FOR THE LAST TEN YEARS.

	£	s.	d.		£	s.	d.
1902	52	8	3	1907	82	1	11
1903	58	3	2	1908	60	0	10
1904	59	0	7	1909	58	17	2
1905	64	16	10	1910	57	3	3
1906	87	8	10	1911	56	1	10

Average for the 10 years, £63 12s. 3d.

CRUSHING AND CYANIDING PLANTS.

RETURNS FROM GOVERNMENT CRUSHING AND CYANIDING PLANTS FOR THE HALF-YEAR ENDED DECEMBER 31ST, 1911.

Name of Mine.	Locality.	Ore Treated. Tons	cwts.	qrs.	Gold Recovered. Ozs.	dwts.	grs.	Value of Gold. £	s.	d.	Yield per Ton, in Shillings.
PETERSBURG GOVERNMENT BATTERY AND CYANIDE WORKS.											
Bonnie Keith	East Wadnaminga..	5	10	0	1	10	8	5	17	8	21/-
New Milo	Wadnaminga	6	5	0	9	0	9	32	14	5	104½/-
Homeward Bound	Mannahill	12	15	0	22	5	20	89	4	6	140/-
Adela	Gawler	11	0	0	7	7	8	26	19	2	49/-
Cousin Jack	Wadnaminga	4	10	1	1	19	2	7	1	9	31¼/-
Mount Hecla	Mannahill	11	5	0	3	12	3	14	4	10	25/-
Blunsden	Petersburg	5	0	0	0	8	11	1	10	8	6/-
Copperlinka	Olary	21	1	0	5	17	20	22	9	1	21/-
Homeward Bound	Mannahill	5	13	0	11	13	2	46	15	9	165½/-
New Milo	Wadnaminga	6	4	0	8	18	16	32	8	3	104½/-
Staer	Western Australia..	0	0	1	0	8	9	1	12	5	spcmns.
Dustholes	Oodla Wirra	10	0	0	16	15	8	59	11	9	119/-
Total		99	3	2	89	16	20	340	10	3	69/-
Grand total since starting of battery		4,381	5	3	4,153	16	10	15,479	13	6	70½/-

RETURNS FROM GOVERNMENT CRUSHING AND CYANIDING PLANTS—*continued.*

Name of Mine.	Locality.	Ore Treated.	Gold Recovered.	Value of Gold.	Yield per Ton, in Shillings.
		Tons cwts. qrs.	Ozs. dwts. grs.	£ s. d.	
MOUNT TORRENS GOVERNMENT BATTERY AND CYANIDE WORKS.					
Deloraine	Kersbrook	5 10 0	3 16 4	14 7 6	61/-
"	Concentrates produced valued ..	—	—	2 8 4	
Deloraine	Kersbrook	4 12 0	4 13 3	17 5 8	107/-
"	Concentrates produced valued ..	—	—	7 6 6	
Mount Torrens	Mount Torrens	10 0 0	—	—	12/-
	Concentrates valued at	—	—	5 18 0	
Deloraine	Kersbrook	28 4 0	21 18 11	81 7 9	84/-
"	Concentrates produced valued ..	—	—	37 12 8	
Deloraine	Kersbrook	100 0 0	57 1 0	200 7 9	53/-
"	Concentrates produced valued	—	—	65 16 0	
Total		148 6 0	87 8 18	432 10 2	58/-
Grand total since starting of battery ..		9,898 2 1	5,824 16 23	22,058 0 3	44½/-

The Petersburg and Mount Torrens Government Batteries and Cyanide Plants are worked alternate months by the one staff. In addition to the crushings recorded numerous assays and amalgamation tests of small parcels of ore have been made.

TARCOOLA GOVERNMENT BATTERY AND CYANIDE WORKS.

No. of Parcel.	Name of Mine.	Ore Treated.	Gold Recovered.	Value of Gold.	Yield per Ton in Shillings.
		Tons cwts. qrs.	Ozs. dwts. grs.	£ s. d.	
164	Curdnatta	17 0 0	9 6 4	31 8 3	37/-
165	Curdnatta	17 0 0	4 13 3	15 14 3	18½/-
166	Tarcoola, Limited	31 10 0	89 3 13	296 4 3	188/-
167	Tarcoola, Limited	25 0 0	10 17 2	35 0 0	28/-
168	The Gem	16 0 0	18 17 9	55 3 9	69/-
Total		106 10 0	162 17 7	433 10 6	81/-
Grand total since starting of battery ..		2,673 0 0	3,761 17 1	13,264 9 7	99/-

GLENLOTH GOVERNMENT BATTERY AND CYANIDE WORKS.

60	Searchlight (C. W. J. Bogh)	15 0 0	8 0 0	24 18 0	33/-
61	New Glenloth (Fabian's No. 3)	9 0 0	17 12 11	54 19 0	122/-
Total		24 0 0	25 12 11	79 17 0	66½/-
Grand total since starting of battery ..		1,763 0 0	1,832 19 13	6,153 2 11	70/-

RETURNS FROM CRUSHING AND CYANIDING PLANTS (OTHER THAN GOVERNMENT) FOR THE HALF-YEAR ENDED DECEMBER 31st, 1911

Name.	Ore Treated.			Gold Recovered.			Value.			Yield per Ton, in Shillings.
	Tons	cwts.	qrs.	Ozs.	dwts.	grs.	£	s.	d.	
TARCOOLA BLOCKS COMPANY'S BATTERY AND CYANIDE PLANT.										
Battery treatment	1,039	0	0	822	0	0	1,945	0	0	—
Total	1,039	0	0	822	0	0	1,945	0	0	37½
Grand Total since starting of Tarcoola Blocks Co.'s battery, May 16th, 1901, to Dec. 31st, 1911.	30,547	0	0	43,095	0	0	130,485	0	0	85½
NEW MEDORA AND GRAINGER COMPANY, MOUNT GRAINGER.										
Battery treatment	470	0	0	65	0	0	229	2	6	—
Total	470	0	0	65	0	0	229	2	6	9¾
KIRKEEK'S TREASURE BATTERY, NILLINGHOO.										
Battery treatment	140	0	0	73	19	0	240	2	4	—
Total	140	0	0	73	19	0	240	2	4	34
KITTICOOLA, REEDY CREEK.										
Battery treatment	746	0	0	181	14	14	615	9	11	—
Total	746	0	0	181	14	14	618	9	11	16½
COMMONWEALTH (WHEAL ELLEN), NEAR STRATHALBYN.										
Battery treatment	60	0	0	11	5	0	—			—
Treated at Cockle Creek	10	12	0	4	15	0	—			—
				16	0	0	52	0	0	—
	Silver			80ozs.			8	0	0	—
	Lead			2·7 tons			43	0	0	—
Total	—						103	0	0	—

TOTAL BATTERY AND CYANIDE RETURNS FROM ALL PLANTS FOR SIX MONTHS ENDED DECEMBER 31st, 1911.

Name.	Ore Treated.			Gold Recovered.			Value.			Yield per Ton, in Shillings.
	Tons.	cwts.	qrs.	Ozs.	dwts.	grs.	£	s.	d.	
Petersburg	99	3	2	89	16	20	340	10	3	69/-
Mount Torrens	148	6	0	87	8	18	432	10	2	58/-
Tarcoola	106	10	0	162	17	7	433	10	6	81/-
Glenloth	24	0	0	25	12	11	79	17	0	66⅓/-
Tarcoola Blocks	1,039	0	0	822	0	0	1,945	0	0	37½/-
Mount Grainger	470	0	0	65	0	0	229	2	6	9¾/-
Kirkeek's Treasure	140	0	0	73	19	0	240	2	4	34/-
Kitticoola	746	0	0	181	14	14	618	9	11	16½/-
Wheal Ellen	70	12	0	16	0	0	52	0	0	15/-
Total	2,843	11	2	1,524	8	22	4,371	2	8	30¾/-

REPORTS ON BORING OPERATIONS.

BORING OPERATIONS AT THE WALLAROO EXTENDED MINE, KADINA.

Report by Mr. A. W. Matthews, Foreman.

The following is the half-yearly report of the boring operations carried on for the half-year ending December 31st, 1911. The dismantling of the drill at Leigh Creek was started and the plant returned to the Waterworks Yard, Kent Town. The staff was then transferred to the Wallaroo Extended Mine, Kadina, and preparations made for the erection of a new Caylx and Diamond combination drill, which was being supplied by the Sullivan Machinery Company. The balance of the plant arrived on September 18th and boring was started on September 22nd, thus leaving only a little over three months for boring operations.

DETAILS OF BORE.

Surface to 10ft.	Surface loam, limestone, and clay.
to 33ft.	Sandstone mixed with small quartz veins.
to 50ft.	Hard blue country. A little iron pyrites.
to 175ft.	Hard quartzite and broken blue country.
to 175ft. 9in.	A little yellow sulphide.
to 312ft.	Hard broken country.
to 314ft. 8in.	Lode formation, carrying a little sulphide.
to 546ft.	Very hard and broken country, with occasional bars of extremely hard quartzite.

Drilling in progress. Angle of bore, 1 in 10.

BORING OPERATIONS AT RAPID BAY.

Report by Mr. C. F. Duffield, Foreman.

No. 1 *Bore* (*vide* Review No. 14, page 17).—Boring operations were continued from 520ft. to 680ft., when it was decided to discontinue at that spot, the country passed through being calcite interstratified with bands of slate carrying pyrites, which disappeared as the depth increased. The country throughout was of a broken nature, which made it necessary to frequently pull out the rods to free the core from the bit. Operations were stopped on August 9th.

No. 2 *Bore.*—It was then decided to remove the plant to a site about 700yds. E. of No. 1 bore and put down an angle hole of 10° from the top of the cliff to cut

the lode at about 400ft. to 500ft. Boring operations were started on August 21st, the country passed through being as follows :—

Surface to 35ft.	Marble.
to 63ft. 10in.	Marble with bands of ironstone.
to 64ft.	Lode material showing a little green carbonate.
to 280ft.	Blue and white marble.
to 322ft.	Calcite, with thin bands of slate showing a little pyrites in bottom.
to 384ft.	Calcite and slate showing pyrites freely.
to 413ft.	Blue slate with bands of calcite showing pyrites, and at 396ft. a splash of yellow sulphide.
to 500ft.	Practically no change, being calcite and slate of a broken nature.

Operations completed on November 16th.

No. 3 Bore.—The plant was then removed to a site about 600yds. S.E. of No. 2 bore, near the old workings, and an angle hole was put down to test the country directly under the shaft, which was sunk to a depth of 102ft. Boring operations started on December 7th, the country passed through being as follows :—

Surface to 21ft. 9in.	Decomposed limestone, clay, and drift sand, with boulders.
to 29ft.	Ironstone conglomerate.
to 47ft.	Conglomerate with bands of calcite.
to 72ft.	Calcite.
to 122ft.	Calcite with occasional bands of ironstone.

The country in this bore is even more broken than the others, and appears to be full of small crevices, which allows the water to escape instead of returning to the surface of the hole. Up to the present nothing of any value has been struck. Total depth of No. 3 bore to December 23rd, 122ft. Total boring for half-year, working one shift, being 782ft., also 270ft. of reaming.

WANDILTA MINE.

Report by Mr. A. W. Matthews.

During the six months the shaft has been sunk a further distance of 50ft., making total depth 292ft. Sinking was continued in the lode cut at 235ft., and footwall was met at 248ft., making total distance from hanging-wall to footwall 13ft. Before reaching the footwall a vugh was cut on the W. side of the shaft., and exceptionally rich ore was taken from same. A crosscut was driven W. through this vugh until the hanging-wall was met, and proved the lode at this point to be 15ft. wide.

Sinking was then resumed in hard country of felspar, intermixed with calcite leaders, which all showed a little yellow sulphide. At 268ft. we passed through a 6in. leader carrying rich ore. From 268ft. to 287ft. sinking continued in very hard country. At this depth a change started to come in, the bottom of shaft being in what appears to be lode formation.

As we had finished this lift it was decided, before cutting plats and fixing No. 2 plunger, to start crosscuts E. and W. to prove the lodes passed through in sinking.

A sump was left 18ft. deep, and a crosscut 7ft. by 6ft. started W. at 273ft. This has been driven 50ft. At 25ft. from shaft the footwall of the lode was cut, and the crosscut continued through the lode until the hanging-wall was met, proving it at this point to be 16ft. from wall to wall. The lode carries rich shoots of ore on both hanging and foot walls, and I am confident that, taken in bulk, it will prove a payable proposition.

A drive N. was started on the hanging-wall and driven 4ft., exposing a shoot of ore of fair average value 2ft. wide near the wall. We are carrying a full face of lode in this drive and leaving some standing on the footwall side. The lode in the face is looking very well and carries good ore right through.

The E. crosscut started at the same level and driven 40ft., with a view to intersect the lode cut in the No. 5 bore at 319ft., has passed through several small leaders carrying good ore, and the face is at present showing yellow ore and mundic, and all indications point to being close to the lode.

The old main shaft, size 10ft. by 5ft., has been cleaned out and timbered for 40ft., making total 124ft. At this depth the water is standing in the shaft, and as no further work could be done without installing pumps, it was decided to stop same and drain the water from these workings when crosscut is connected from prospecting shaft. All the machinery is in good order and working well. The water keeps about the same; 12in. plunger working 6½ strokes per minute on an 8ft. stroke. An electric lighting plant has been installed on the mine and is working satisfactorily.

SUBSIDIES.

The Legislature provided in the Mining Act, 1893, and in previous measures for the encouragement of Mining.

The following schedule shows what subsidies have been paid from the inception of the system to December 31st, 1911, and the sums repaid. In the ordinary way these repayments are made from profits—50 per cent. of such profits being devoted to repayments. In two instances only have the profits won enabled full repayments to be accomplished—the Crystal Mine, at Echunga, which repaid £76 7s. 6d. from that source, and the once-famous New Alma and Victoria Mine, Waukaringa, which repaid in full the first subsidy, £3,000. The remainder of the recoveries was derived from sales of mining plant held as security. The total subsidies advanced is £55,237 18s. 6d., of which £6,111 13s. 9d. has been recovered, leaving a debit balance of £49,126 4s. 9d. Portion of this outstanding debt is represented by machinery that has fallen into the hands of the Government; add to this the value of the metals won, and the State in general will probably have benefited beyond the money value of the debit balance.

STATEMENT OF SUBSIDIES PAID FROM COMMENCEMENT TO DECEMBER 31ST, 1911.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.	Amount Repaid.
		£ s. d.	£ s. d.
Adelaide Crushing, Grinding, and Amalgamating Mill Co.	—	100 0 0	—
Algebuckina Gold Mining Syndicate	Algebuckina	52 10 11	52 10 11
Alma Extended Gold Mining Co.	Waukaringa	3,000 0 0	22 5 0
Backhouse, T. S	Worturpa	100 0 0	—
Barossa Enterprise Gold Mining Coy.	Barossa, Hundred of	232 2 6	—
Belalie Copper Mining Syndicate	Bundaleer	392 12 3	—
Beltana Rapid Ore Treatment Syndicate	Near Beltana	95 0 7	—
Bevilaqua & Angel	Palmer (near)	57 18 0	—
Bird-in-Hand Gold Mining Co, Ltd.	Woodside	3,000 0 0	—
Blackfellow's Creek Gold Mining Co., Ltd.	Kuitpo, Hundred of	660 6 7	35 0 0
Callington Copper Mining Co.	Callington	148 8 7	—
Cockburn Copper Mining Co., N.L.	Mutooroo	273 18 5	—
Commonwealth Silver-lead Co., Ltd.	Strathalbyn, Hund. of	750 0 0	—
Copper Hill Mining Co., N.L.	Kadina	391 15 0	—
Countess of Jersey Gold Mining Co., N.L.	Wadnaminga	321 0 0	—
Currency Creek Copper Mining Co.	Currency Creek	28 6 5	20 0 3
Crystal Gold Mining Co.	Echunga	563 17 6	176 7 6
Ding Dong Copper Mining Syndicate	Kanmantoo. Hund. of	124 0 4	—
Duke of Cornwall Gold Mining Syndicate	Mount Pleasant	458 17 4	43 10 0
Eagle Silver Mining Co, Ltd.	Glen Osmond	500 0 0	—
Echunga Proprietary Hydraulic Gold Sluicing Co., N.L.	Echunga	500 0 0	20 0 0
Ediacara Consols Silver Mining Co., N.L.	Ediacara	651 12 1	375 17 0
Enterprise Copper Mining Co., N.L.	Barossa, Hundred of	150 0 0	9 16 0
Enterprise Excelsior (Barossa Amalgamated)	"	2,000 0 0	—
Eureka Gold Mining Co., Ltd.	Woodside	1,500 0 0	—
Fifth Creek Central Silver and Copper Mining Co., N.L.	Fifth Creek	253 2 4	—
Fortress Hill Mining Syndicate	Fortress Hill	60 0 0	—
Glenloth Mining, Battery, & Options Co., N.L.	Glenloth	515 4 7	515 4 7
Glenloth Wells Pioneer Blocks Co., Ltd.	"	100 0 0	22 18 5
Gumeracha Gold Mining Syndicate	Gumeracha	75 0 0	—
Golden Point Claims	Wonna	50 0 0	—
Great Ironclad Gold Mining Co.	Teetulpa	218 6 9	—
Hakendorf, C. H., and Williams, J. (Glenmarkie Mine)	Glenloth	221 17 6	—
Hamley Copper Mining Co.	Wallaroo	2,000 0 0	—
Heithersay, J., Mt. Grainger Medora Mines	Mount Grainger	77 7 7	—
Homeward Bound and Klondyke Gold Mines, N.L.	Mannahill	192 17 1	—

STATEMENT OF SUBSIDIES PAID—*continued.*

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.			Amount Repaid.		
		£	s.	d.	£	s.	d.
Hunter Bros. (Lady Millicent Mine)	Mochatoona	100	0	4	—		
Ireby Gold Mining Syndicate	Mount Grainger	35	4	3	—		
Kirkeek's Treasure Gold Mining Co.	Waukaringa	691	8	1	—		
King's Bluff G.M. Co., N.L.	Olary	324	11	9	—		
Kohinoor Gold Mining Co., N.L.	Kangaroo Island	137	17	0	—		
Kohinoor Mine (H. G. Taylor)	"	200	0	0	—		
Lady Alice Gold Mining Co.	Barossa, Hundred of	1,797	2	3	—		
Lady Franklin Syndicate	Port Lincoln	200	0	0	40	0	0
Leigh's Creek South Coal Mining Co., N.L.	Leigh's Creek	95	16	4	95	16	4
McMurtie's Claims	Kuitpo, Hundred of	199	19	11	—		
Medora and Grainger Gold Mines Syn., N.L.	Mount Grainger	844	2	2	—		
Mingary Gold Mining Co.	New Luxemburg	400	0	0	—		
Mount Victoria Mine	Bimbowrie	50	0	0	—		
Mount Malvern Silver Mining Co.	Blackwood	491	3	6	—		
Mount Malvern Silver-lead Mining Co., N.L.	Clarendon	1,347	15	3	—		
Mount Pangæus Gold Mining Co.	Hahndorf (near)	56	1	4	—		
Mount Monster Gold Mining Syndicate	Kuitpo, Hundred of	350	0	0	1	0	0
Mt. Grainger Ironclad Gold Mining Syn., Ltd.	Mount Grainger	21	18	10	—		
Mount Torrens Gold Mining Co.	Mount Torrens	1,000	0	0	—		
Musgrave Ranges Prospecting Association	Musgrave Ranges	47	2	0	—		
Mount Painter Corundum and Gem Syndicate	Mount Painter	47	3	1	—		
Morning Star Gold Mining Co.	Teetulpa	68	4	6	—		
Mutooroo Copper and Silver Mining Co., Ltd.	Mutooroo	500	0	0	500	0	0
Nackara Proprietary Copper Mining Co, N.L.	Nackara	100	0	0	—		
Nackara Proprietary Gold Mining Syndicate.	Nackara	100	0	0	—		
New Banksia Gold Mining Syndicate	Nairne	250	0	0	—		
New Alma and Victoria Gold Mining Co., Ld.	Waukaringa	3,000	0	0	3,000	0	0
New Ajax Consolidated Gold Mining Co., N.L.	"	750	0	0	—		
New Era Gold Mining Co., Ltd.	Woodside	1,000	0	0	—		
New Glenloth Battery and Mining Co., N.L.	Glenloth	750	0	0	—		
New Mingary Gold Mining Co.	New Luxemburg	250	0	0	—		
New Mount Grainger Gold Mines, N.L.	Mount Grainger	393	7	1	220	0	0
Northern Mining and Smelting Co., N.L.	Mount Fitton	350	0	0	—		
North Nairne Gold Mining Co.	Nairne	500	0	0	—		
North-West and West Australian Pros. Co.	North-west of S.A.	104	9	7	—		
North-West Prospecting Association, N.L.	Tarcoola	150	0	0	—		
Nil Desperandum Teetulpa Devt. Co., N.L.	Teetulpa	64	14	4	20	5	6
Nilpena Copper Mining Co., Ltd.	Blinman	290	5	3	—		
Onkaparinga Dredging and Mining Co.	Biggs' Flat	550	0	0	—		
Paull's Consolidated Copper Propy., N.L.	Burr Well	525	0	0	—		
Parara Mining Co., N.L.	Maitland	571	3	6	—		
Paringa Mining Syndicate	Callington	399	16	8	244	0	0
Paringa and West Kanmantoo Consolidated Copper Mine, N.L.	"	1,144	3	4	—		
Pioneer Gold and Copper Mining Syndicate	"	95	15	6	—		
Polmear, W. J. L.	Kadina	800	0	0	—		
Queen Bee Mining Co., N.L.	New Luxemberg	250	0	0	250	0	0
Quorn Manganese and Silver Mining Co.	Quorn	10	9	10	—		
Rapid Bay Silver Mining Co., N.L.	Yankalilla, Hund. of	136	2	4	—		
Royal Charlie Gold Mining Co.	Mannahill	153	18	5	—		
Rees, R., Ajax Mine	Waukaringa	604	14	5	—		
Stainbank, A. T.	Fifth Creek	70	14	11	—		
Sliding Rock Copper Proprietary, N.L.	Sliding Rock	2,000	0	0	5	12	0
Tarcoola Blocks Gold Mining Co., Ltd.	Tarcoola	3,995	5	2	—		
Tarcoola Enterprise Gold Mining Co., N.L.	"	100	0	0	19	10	4
Tarcoola Proprietary Gold Mines, N.L.	"	150	4	4	9	15	
Teatree Gully Gold Mining and Pros. Assn.	Teatree Gully	234	5	7	—		
Teetulpa Mining and Crushing Co.	Teetulpa	349	11	4	—		
Teetulpa Prospecting Syndicate	"	49	15	6	—		
Tumby Bay Copper Mining Co., N.L.	Hutchison, Hund. of	290	14	9	—		
Victoria Hill Amalgamated Gold Mining Syn.	Barossa, Hundred of	38	12	6	—		
Victoria Tower Mining Co., N.L.	Mannahill	345	18	9	90	0	0
Warrakimbo Propy. Copper Mining Synd.	Barndioota, Hundred of	220	16	2	—		
Warra Warra Propy. Copper Mines, N.L.	Farina	322	4	11	322	4	11

IRON ORE WORKINGS, IRON KNOB.

[Photo. by Alfred Vaughan, Govt. Photolithographer.

DECENNIAL RETURN SHOWING OUTPUT AND VALUE OF VARIOUS METALS AND MINERALS PRODUCED IN SOUTH AUSTRALIA SO FAR AS CAN BE ASCERTAINED.

Year	Gold.		Silver.		Silver Lead Ore.		Copper.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ounces.	£	Ounces.	£	Tons.	£	Cwts.	£
1902	7,231	24,878	—	—	2,680	19,740	136,937	388,162
1903	8,650	28,650	7,086	804	211	1,267	129,812	417,116
1904	17,897	76,025	—	—	—	—	125,560	382,356
1905	10,983	45,853	—	—	—	—	130,959	426,511
1906	8,037	27,000	801	104	—	—	164,160	718,609
1907	5,609	20,540	5,845	780	1,000	11,000	158,620	690,000
1908	2,908	12,300	—	—	900	9,000	112,554	338,000
1909	7,111	30,206	1,660	167	70	416	113,940	334,584
1910	6,603	28,000	6,250	625	25	22	102,440	306,120
1911	3,537	15,000	1,400	140	—	—	118,440	332,500
Totals....	—	308,452	—	2,620	—	41,445	—	4,333,958

Year.	Copper Ore and Regulus.		Lead.		Ironstone Flux.		Limestone Flux.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value
	Tons.	£	Cwts.	£	Tons.	£	Tons.	£
1902	2,579	42,550	43,507	22,303	—	—	—	—
1903	7,069	54,922	14,408	8,799	84,932	46,712	—	—
1904	3,051	24,597	—	—	46,687	27,091	43,440	6,516
1905	2,563	28,434	1,040	369	84,483	48,577	44,498	4,791
1906	—	—	1,000	550	75,226	33,852	31,940	4,791
1907	—	—	—	—	84,600	38,100	31,100	5,800
1908	—	—	—	—	88,000	39,600	29,500	6,000
1909	1,230	4,003	140	90	16,120	8,296	13,765	2,464
1910	—	*9,350	400	260	46,200	21,945	18,600	3,720
1911	—	*11,103	—	—	42,300	26,400	28,700	7,175
Totals	—	174,959	—	32,371	—	290,613	—	41,257

Year.	Phosphate Rock.		Crude Salt.		Other Metals and Minerals.	Total Value.
	Quantity.	Value.	Quantity.	Value.	Value.	
	Tons.	£	Tons.	£	£	£
1902.....	—	—	—	—	742	498,375
1903.....	1,000	1,000	40,000	12,000	100	571,371
1904.....	3,000	3,000	40,000	12,000	198	531,783
1905.....	5,000	5,000	32,500	13,000	1,261	573,796
1906.....	5,850	5,850	55,000	27,500	2,209	820,465
1907.....	8,000	8,000	75,000	37,500	2,500	814,220
1908.....	11,000	11,000	75,000	37,500	4,500	457,900
1909.....	3,772	3,697	51,407	25,594	3,873	413,390
1910.....	5,200	5,200	54,000	27,000	†13,600	415,842
1911.....	5,800	5,800	65,000	40,600	†11,319	450,054
Totals	—	48,547	—	232,694	40,302	5,547,196

* Bluestone, £5,980; Sulphuric Acid, £3,370.
" £4,163 " £6,940.

† Including Gypsum, £9,000; Pyrites, £3,270.
" £7,275; " £2,580.

PARAMATTA AND YELTA COPPER MINES.

Report by Mr. Frank Richards, Manager.

The Paramatta and Yelta Mines (*vide* Record, pages 111 and 155, and Reviews Nos. 11, 13, and 14) have been actively worked during this period.

Towards the end of June the work of unwatering the Yelta mine was commenced, and up to the end of December the water had been lowered to 796ft. from the surface. In addition to the shaft itself, vast open workings, from which ore was extracted during the early days, and 7,550ft. of drives and connections have been drained. As the water was lowered it was found that the influx had caused considerable damage to the shaft and main drives, and extensive repairs have been effected to these parts. The action of the water on all the ironwork in the mine was very severe, and the greater part of this has had to be renewed. As soon after starting operations as was possible, attention was given to prospecting some of the practically untested lodes on the property, and in connection with this work 280ft. of shaft sinking and 320ft. of driving has been done. The most important of these works is that of No. 1 prospecting shaft, situated some 1,200ft. S. of the main shaft, where a shaft was started on a very promising formation, and from a depth of from 80ft. to 110ft. from the surface produced some high-grade copper ore (specimens assaying as high as 65 per cent. of copper). The shaft has been continued vertical, so that further information regarding the values contained in this underlie lode can only be ascertained by a crosscut from the shaft. It is further intended to test the extension of the main lode in the vicinity of this prospecting shaft by a crosscut E., and this most important work will be put in hand as soon as the shaft has reached a depth of 200ft. Although the so-called main lode on the Yelta lease has been thoroughly tested in depth by shaft-sinking to 1,200ft., only a comparatively short length of the ore body has been tested, and there is no reason to suppose that the lode to the S. of the main shaft and approaching the boundary of the Wallaroo and Moonta Co.'s leases, will not prove as productive as that already developed in the northern parts. It is obvious that should an extension of the ore body towards the S. be proved to exist (and as pointed out there is every reason to hope for this), the output from the mine will be largely increased. There yet remain many very promising lodes to prospect, and I understand that as soon as practicable the Government diamond drill will be brought here to assist in the work. Some of these lodes were proved by shaft-sinking many years ago to be very productive to a depth of 240ft., at which depth, for various reasons, development ceased, and it is on these lodes the diamond drill will be used for testing at about a depth of 600ft. Other equally promising lodes have so far never been tested, but these will all have attention as soon as the circumstances permit. In addition to prospecting work, the known ore bodies at the main shaft have been further developed by driving and rising at various points, and preparations have been made for resuming production on a large scale. A careful examination of the mine has revealed considerable quantities of payable ore, so that immediately the mine is drained of accumulated water, ore-raising and smelting will be resumed, with, I feel confident, satisfactory results.

REPORTS FORMING ADDENDA TO THE RECORD OF MINES.

By the Inspector of Mines (Mr. Henry Jones).

Boomerang Gold Mine (*vide* Record, page 210).—Situated about 9 miles N. from Mannahill and about 100yds. from the Broken Hill railway line. A large ferruginous quartz lode traverses the property, strike N. and S., dip nearly vertical. A considerable amount of work has been done for a length of five chains along the line of lode by open trenches to depths of from 4ft. to 10ft., and the formation disclosed in the workings consists chiefly of quartz, ironstone, and iron pyrites, and judging from the amount of work done, a large quantity of ore must have been extracted and treated from the various workings.

About the centre of the open workings a shaft has been sunk, partly vertical and partly underlie, to a depth of about 60ft.; the lode disclosed is fairly defined and from 2ft. to 3ft. wide, carrying gold. Two samples taken from a dump of ore from the main shaft gave on assay—

No. 1 sample—Mostly pyrites, 1oz. 8dwts. gold per ton.
No. 2 sample—Quartz and pyrites, 3dwts. gold per ton.

The reef is strong and seems highly favorable for containing rich shoots of ore; the prospects in all the old workings appear fairly encouraging and fully justify the lodes being tested to a greater depth. (7–10–11.)

The Bonnie Keith Gold Mine.—Situated 2 miles E. from Taltabooka Well. A large lode formation traverses the block, and can be traced on the surface for a length of over 100ft., bearing E. and W., and dipping S. at an angle of 48°. The main workings are situated near the top of a hill, 60ft. above the plain, and consist of two underlie shafts about 100ft. apart. No. 1 shaft, sunk partly in the lode and partly in the hanging-wall country, is down a total depth of 50ft., the ore body disclosed from 22in. to 24in. wide, and consists chiefly of ferruginous quartz and sandstone, carrying a little gold. Samples taken from the formation at various levels in the shaft gave the following results:—

1 and 2. E. and W. side of shaft, 50ft. level Nil.
3. E. side of shaft, 40ft. level ..... Trace—2dwts. gold per ton
4. W. " " " ..... Trace
5. E. " 25ft. " ..... 2dwts. gold per ton
6. W. " " " ..... 2dwts. gold per ton
7. Footwall, centre of shaft, 15ft. level .. Trace
8. From ore dump on surface..... 8dwts. gold per ton

This last sample (No. 8) was taken from a dump of ore (about 15 tons), apparently picked out from the lode material obtained while sinking was in progress.

No. 2 underlie shaft, situated E. from the main workings, was started on the outcrop of the formation and sunk to a depth of 15ft.; the lode material disclosed consists of ferruginous quartz and sandstone 2ft. 4in. wide. A sample of the formation taken from near the bottom of the shaft gave 2dwts. gold per ton.

Between No. 1 and No. 2 shafts the outcrop of the lode is exposed for a length of 100ft. and consists chiefly of ferruginous quartz 2ft. to 6ft. wide. A sample taken from various points along the outcrop gave 4dwts. gold per ton.

The present holder of the property recently sent away about 6 tons of ore, which returned by battery 8dwts. 10grs. gold per ton.

The samples taken from the various working parts of the lode shows that in bulk the formation is of low grade and will average from 2dwts. to 3dwts., but by care-

fully selecting the gold-bearing ore from the other material much better results will be obtained. The lode formation in the present limited workings appears promising and likely to go down, and may, on being further developed, prove to contain better values. There are several other quartz reefs traversing the block that are well worth having a little work done on them to prove extent and value. Timber for fuel and mining purposes are fairly plentiful within a short distance of the mine, and with regard to getting a supply of water, the best plan would be to put down a bore hole on the plain about 500yds. W. from the mine, at what appears to be a promising spot for obtaining water at a shallow depth. (4–10–11.)

The Cornwall Copper Mine (*vide* Record, p. 46).—Situated about 1 mile from Kadina, and adjoining the S.E. boundary of the Wandilta property. For several years past a considerable amount of work has been done on the property down to water level—a depth of 13 fathoms; a great number of small shafts have been sunk at various points over an area of 3 chains wide and 18 chains along the line of lode; driving and stoping have been done, and the ore body for a considerable length has been stoped out up to the surface.

The ore channel as disclosed by the workings is of considerable width, and consists of ferruginous schist, quartz, and decomposed sandstone. The ore occurs in seams and bunches, 1in. to 12in. wide, chiefly green and blue carbonates and steel-grey ore of exceedingly high grade. The rich veins in places are several feet apart, with lower grade material between. Some of the veins are vertical, others with a slight dip to the W., indicating that probably at greater depth in the settled country the veins will meet and make into one compact ore body.

Until recently several parties of miners were working at various points along the line of lode, operating on different veins of ore traversing this large formation, and some hundreds of tons of excellent ore were extracted and sent away for treatment, and at present there are from 80 to 100 tons of 18 per cent. to 35 per cent. ore stacked on the surface.

The two formations disclosed in the Cornwall workings are fairly consistent, bearing N. 40° W., with a slight dip W., and traversing the country in a line parallel with the Wandilta lode formations, but a short distance E. of the latter.

Judging by the trend of the Wandilta lodes recently disclosed in that property, it appears quite probable that they traverse the Cornwall leases, but owing to the distance between the two mines, and as there is from 10ft. to 30ft. of alluvial deposit covering the strata, it is rather difficult to say if any displacement in the country has occurred in that part, which may have shifted and altered the general trend of the various ore bodies, so accurately determined by the diamond bore holes on the Wandilta property.

Independent of any other formations that may be discovered on the Cornwall property, the prospects of the large formations already proved and operated on to a shallow depth and for a length of about 1,000ft. is of such an encouraging nature that the testing of the ore bodies at greater depth is fully warranted.

To further prove the large formations traversing this property the cheapest and most expeditious way would be to put down a series of bore holes along the line a short distance W. from the present workings, with a slight angle to the E., to intersect the lode formation at from 500ft. to 600ft. from the surface. This would give a very fair idea of the width and values of the ore bodies in the sulphide zone, and would also be of great assistance in selecting the best site for a main working shaft, and for future operations on the property. (24–11–11.)

Copperlinka Gold Mine (*vide* Reviews Nos. 13 and 14).—Since my last visit to this mine a new vertical shaft was started at a point 80ft. S.W. from the underlie workings and sunk to a depth of 51ft. At a depth of 49ft. a vein of ore 6in. wide was intersected. From the bottom of this shaft a drive E. has been carried in

17ft. 6in., at which point a fault in the country bearing N. and S. crossed the drive, cutting off the lode, and making a down-throw of about 3ft. going E.

The vein of ore from the shaft to the fault is well defined, and consists of ferruginous quartz and ironstone from 6in. to 12in. wide, carrying a little gold. Two samples taken from the vein in the drive gave on assay—No. 1, from near the shaft, 1dwt. of gold per ton ; and No. 2, from farther in, about 12ft. from the shaft, only a trace of gold.

From the end of the drive E. of the fault a rise has been put up and connected with a winze sunk from No. 1 level. On each side of it the lode has been stoped out for a width of 16ft., and 20 tons of ore obtained from the workings were recently sent away for treatment. The vein of ore operated on is from 12in. to 15in. wide. A sample taken about 10ft. up the rise gave 2dwts. of gold per ton, and one taken from the vein on the E. side of the fault gave 7dwts. gold per ton.

The work done so far in the vicinity of the disturbed country is not sufficient to enable one to determine exactly to what extent the ore body has been displaced, but judging by the angle of the dip of the faulted country, it appears quite possible that the main lode is under foot and that the leader already passed through in the shaft is only an offshoot from the main body.

The present shaft should be continued down to prove the ground at a deeper level, also drives in the lode should be put in N. and S. from the bottom of the rise E. of the fault and parallel with it, to prove the extent and value of the ore in that direction. (4–10–11.)

Copper Queen Mine (*vide* Reviews Nos. 9 and 10).—The property of the Beltana Rapid Ore Treatment Syndicate. Situated 4 miles W. from Beltana. A large copper lode formation traverses the blocks, bearing N.E. and S.W. with a slight underlie S.E. A considerable amount of work has been done along the line of lode by open cuts and prospecting shafts for a length of 4 chains. The formation disclosed in the various workings consists chiefly of decomposed slate, with seams and nodules of grey ore and ruby oxide. The whole formation is strongly impregnated with green carbonates for a width of from 10ft. to 15ft. In No. 1 shaft, sunk in the formation to water level—a depth of 84ft.—a fair amount of driving and stoping has been done, and considerable quantities of high-grade ore were obtained from the workings. At present this shaft is in a bad state, but will, when repaired, be useful for ventilating purposes. The sinking of a new vertical shaft 6ft. by 4ft. 6in. in the clear has been started, and has now reached a depth of 35ft. The ore body disclosed in the shaft is highly promising, and appears likely to continue down to a great depth.

The rapid ore treatment plant recently erected on this mine at a cost of £750 is doing excellent work on 2 per cent., 3 per cent., and 4 per cent. copper ore previously going to waste, being of too low a grade to pay for sending away ; but now, with the new rapid process, all the low-grade ores can be treated on the mine, and the concentrates obtained from the operation are from 79 per cent. to 80 per cent. copper. The working of the plant to its full capacity is at present greatly hampered owing to the inadequate water supply and shortage in settling vats.

The sinking of the main shaft should be continued down to a further depth of from 60ft. to 70ft., at which level an ample supply of water for all purposes would be obtained, and the sinking and equipping the shaft should not cost more than from £300 to £320. That, and about £100 spent in buying four or five new vats, would put the mine and plant in fairly good order, and give the venture a reasonable chance to become a highly remunerative one in the future. (24–7–11.)

Calcookra Copper Mine (*vide* Review No. 12).—Situated in the hundred of Hawker, 18 miles W. from Franklin Harbor. The main workings are 40ft. above the creek, and consist of an underlie shaft sunk in the lode formation to a depth of

49ft. At the 43ft. level a fair amount of driving has been done on the course of the lode. The S.W. drive is in a total distance of 20ft. The formation disclosed consists of decomposed material, carrying green and blue carbonates; the lode is 14in. wide for the first 6ft. in the drive, it then narrows down gradually to about 3in. in the face, between two well-defined walls. A sample taken from the vein in the face gave on assay a trace of copper. Sample taken from the lode in the bottom of the drive near the shaft for a width of 14in., gave 1·2 per cent. copper. The drive N.E., opposite the last, has been carried in on the lode a total distance of 32ft., and the ore body overhead has been stoped out up to the 21ft. level, except a small pillar left to protect the shaft.

The lode formation disclosed in these workings is from 2ft. to 3ft. wide, carrying high-grade copper ore (chiefly malachite and azurite). About 30 tons of fairly high-grade ore were obtained from this part of the mine. Sample taken from the lode 2ft. wide in the back of the drive near the shaft assayed 9·3 per cent. copper and 1oz. 8dwts. of silver. A sample taken from the lode 14in. wide in the bottom of the drive close to the N.E. end of the shaft gave 3·8 per cent. copper and 12dwts. of silver per ton.

At the 21ft. level, the S.W. drive is in a total distance of 17ft. The vein disclosed in the face of the drive is similar to that in the bottom level, 3in. wide of soft material with copper stains. The N.E. drive opposite is in a total distance of 32ft., and at that point has been connected with the vertical shaft sunk from the surface in the footwall of the lode to a depth of 47ft.; the formation in the back of the drive is from 3ft. to 4ft. wide, impregnated with green and blue carbonates. Sample from the formation in the back of the drive for a width of 2ft. gave 3·3 per cent. copper and 10dwts. of silver per ton. Sample of the lode material in the shaft between the two levels assayed 14·2 per cent. copper and 5ozs. 14dwts. silver per ton.

The shoot of ore so far disclosed in this mine is about 45ft. long, dipping slightly N.E., with every indication of continuing down; but before expending much money on machinery, &c., the ore body should be further proved to a greater depth, and that could be done at a comparatively small expenditure by continuing down the present underlie shaft.

In the vertical shaft, 7 chains S.W. from the main workings, at the 62ft. level, a crosscut was recently started N., and has been extended a total distance of 18ft.; the country passed through is chiefly quartzite, carrying no value. (16–8–11.)

Dustholes Gold Mine (*vide* Record, page 214, and Reviews Nos. 8, 13, and 14).—Situated about 2½ miles N.W. from Mount Grainger Mine. The vertical shaft started on the top of the hill has been sunk to a depth of 35ft.; the lode material disclosed consists of quartz, sandstone, and iron veins carrying gold. Driving S.W. from the shaft at the 20ft. level is in progress, and has reached a total distance of 95ft. The portion of the formation operated on consists of quartz and ironstone 4ft. to 5ft. wide, carrying gold; but, as shown by samples taken, the largest portion of the gold occurs in the iron veins, which are from 1in. to 4in. thick. Samples taken from N. and S. sides of drive gave 2dwts. gold per ton each; sample taken from iron vein 4in. thick, gave 3ozs. 12dwts. gold per ton; and one from a dump, 8 tons of picked ore, gave 2ozs. gold per ton.

A considerable amount of work has been carried on by open cuts at various points along the line of lode, both E. and W. from the present workings. The formation exposed and operated on appears fairly consistent in width, averaging about 25ft. wide. A large quantity of ore has been obtained and treated from the various workings, yielding from 6dwts. to 10dwts. of gold per ton. (13–10–11.)

Deloraine Gold Mine (*vide* Reviews Nos. 10, 13, and 14).—The principal work carried on at present consists of driving N. and S. in the lode formation from No. 3 shaft at the 109ft. level. The S. drive is in a total distance of 45ft., and the N. 36ft. from the shaft. The formation consists chiefly of slates, veins of honeycomb

quartz, and quartz crystals; the quartz seam near the hanging-wall is from 6in. to 12in. wide, and appears likely to contain a fair amount of gold. The lode at this level looks promising and likely to continue down.

Water is making, at present depth, about 3,000galls. per hour. The shaft is equipped with poppet heads, winding winch, 60-h.p. steam pump, and two vertical boilers; everything appears in a good way for developing and opening out the mine.

About three chains N. from No. 3 shaft tunnelling is in progress with the view of picking up the continuation N. of the main lode. The tunnel is in a total distance of 82ft., the country passed through being chiefly ferruginous sandstone, slate, and quartzite in alternate layers of the usual gold-bearing character; but so far no lode has been met with. (19–10–11.)

Deloraine Blocks Gold Mine.—Situated about ¾ mile S. from the Deloraine mine and adjoining its southern boundary. The work carried on here at present consists chiefly of putting in a tunnel W. from the side of a hill, at right angles to the bearing of the lode formation, with a view of picking up the lode now operated on in the Deloraine Mine. Good progress has been made with the work and the tunnel is in a total distance of 104ft. The material passed through consists mainly of alternate beds of ferruginous quartzite, sandstone, and slates of the usual gold-bearing character.

In the last 10ft. or 12ft. of tunnelling several small quartz leaders are disclosed, but at the points intersected they are poor. Four samples taken from along the N. side of the drive near the face gave no return of gold.

Tunnelling should be continued farther W., where possibly more ore and higher values will be discovered. (19–10–11.)

Golden Gate Gold Mine (*vide* Record, page 218).—Locality, about 5 miles S. from Angaston. The main workings are situated on the rising ground about 30ft. above the gully, and consist of several shafts sunk to depths varying from 40ft. to 170ft. At the 40ft. and 100ft. levels, a considerable amount of driving and stoping has been carried on S. from the shafts, and a fair quantity of lode material carrying good gold was extracted from the various workings. Some of the ore treated was rich, yielding 7ozs. gold per ton. The mine has been equipped with winding and pumping plants, boilers, poppet heads, and 10-head mill. Everything about the mine appears to be in a good state to carry out mining operations on an extensive scale.

At the time of my visit no work was in progress at the mine; the workings were partly filled with water and could not be examined, but one of the men who was last employed, driving at the 170ft. level, informed me that the prospects of meeting with rich gold at that level are very promising. (21–9–11.)

Great Eastern Gold Mine (*vide* Record, page 322).—Situated at Wadnaminga, E. of and adjoining the New Milo. Recently this property was taken up by a party of men with a view of restarting the mine. The old workings consist mainly of three underlie shafts, sunk to 40ft., 70ft,. and 180ft. respectively. Driving and stoping has been done at various levels, and a fair quantity of ore appears to have been extracted. The lode formation traverses the property in an E. and W. direction, dipping S. at an angle of 27°, and is composed of quartz, with iron pyrites and slate from 6in. to 12in. wide, carrying gold. About 4½ tons of ore from this mine were recently treated and gave a return of 16dwts. gold per ton. A sample taken of the ore at the 40ft. level, gave on assay 18dwts. gold per ton, and one from the stope, 35ft. level, 1dwt. gold per ton. A sample taken from a large dump of tailings on the mine gave 3½dwts. gold per ton. (4-10–11.)

Golden Record (*vide* Record, page 321, and Review No. 14).—Situated at Wadnaminga. Since my last visit to this mine the prospecting shaft on the underlie of the lode has been continued down to a depth of 70ft. The lode disclosed consists chiefly of ferruginous quartz, fairly defined, and from 9in. to 12in. wide. Two samples taken from the vein at the bottom of the shaft gave a trace of gold. (4-10-11.)

Homeward Bound Gold Mine (*vide* Record, page 245, and Reivews Nos. 9, 11, and 14).—Principal work carried on at present is stoping out ore at the bottom of the shaft sunk near the Klondyke boundary, which has been carried down on a shoot of ore to a depth of 30ft. on the underlie and for a width of over 20ft., and fairly high-grade ore has been extracted from this part of the workings. The last 5½ tons of ore treated gave a return of over 2ozs. gold per ton. (8–10–11.)

John Snell's Copper Mine.—Situated about 200yds. E. from old Angepena Police Camp. A well-defined copper lode formation traverses the property, bearing E. and W., dip S. The open workings along the line for a length of 1½ chains, and to depths of from 3ft. to 8ft., disclose a defined lode, which consists of ferruginous quartz and calcite 12in. to 15in. thick, containing green carbonates, small seams of grey ore and patches of copper pyrites. A sample of the lode material taken from a depth of 6ft. and for 12in. wide assayed 7·9 per cent. copper; and a sample from a small dump of dressed ore on surface gave a trace of gold and 17 per cent. copper. The lode traverses the country rock, which is chiefly slate, at right angles to its bedding; it appears likely to continue down to a great depth, and the prospects in the present shallow workings are very encouraging and fully warrant further sinking to prove the lode at greater depths. (5–7–11.)

Kitticoola Gold Mine (*vide* Record, page 70, and Reviews Nos. 8, 9, 13, and 14) —A considerable amount of necessary developmental work has been done recently on this property, both underground and on the surface, with a view of increasing the output of the mine. Five additional head of stamps have been erected, making the crushing plant up to a 10-head mill, with another five-head stamps on the mine ready to be erected. A suction gas engine, capable of driving a 20-head stamp. mill has been installed; everything is working satisfactorily, and the cost per ton of ore treated has been greatly reduced. The machinery and plant are all housed in under one roof, with sufficient room in the buildings for another 10-head of stamps.

The cyanide plant erected on the mine a few months ago has not yet been quite successful in treating the tailings, owing mainly to the high percentage of copper in the ore.

At the 180ft. level, driving, stoping, and winze-sinking are in progress at various points in the ore body, and large quantities of lode material available for stoping are disclosed in the various workings.

A winze has been started from the 180ft. level, sunk on a slight angle to the N., in conformity with the dip of the ore shoots, and is down a total depth of 35ft., equipped with tram road, and steam winch to haul up the full trucks to the 180ft. level. From that point the trucks are run out through the adit direct to the battery ore bin.

Since my last visit 420 tons of ore treated on the mine gave a return of 130ozs. 2dwts. 21grs. of smelted gold. (18–10–11.)

King's Bluff Gold Mine (*vide* Record, page 223, and Reviews Nos. 8, 9, 10, 13, and 14).—Sinking of the main shaft is the principal work carried on at present, and the contractors are making good progress. The shaft is now down 126ft. The country passed through consists chiefly of alternate beds of slates, quartzite, and conglomerate highly mineralised, and it is quite probable that when the reef is intersected in these strata it will be found to contain high values. Sinking of this shaft will be continued, and it is anticipated that the lode operated on in

IRON ORE WORKINGS, IRON KNOB.

Photo. by Alfred Vaughan, Govt. Photolithographer

the underlie shaft will be intersected at a depth of 260ft. from the surface, where in the latter workings the lode proved fairly rich and gave good returns by battery treatment. (14–7–11.)

The shaft is now down a total depth of 154ft., and at the 145ft. level a small plat has been cut out and extended 6ft. The country passed through consists chiefly of slate. Highly mineralised water is making in the shaft, at present about 600galls. in 24 hours, but is increasing as depth is attained, and will soon get more than can be handled with the present appliances.

To facilitate further sinking and to contend with the quantity of water likely to be met with in going down, it will be necessary very soon to equip the shaft with winding plant and larger kibbles. (7–10–11.)

Kirkeek Treasure Gold Mine, Nillingho (*vide* Record, page 225, and Reviews Nos. 8, 11, and 13).—Work is carried on at present in the bottom of the open workings at the 30ft. level, where the formation shows a width of fully 24ft., and consists mainly of ferruginous quartz, sandstone, and numerous iron veins, 1in. to 3in. wide, traversing the formation in various directions, some of the veins being fairly rich in gold.

Driving E. is in progress on portion of the lode near the hanging-wall; the drive is in 40ft., the ore body operated on is 10ft. wide, composed of quartz and iron veins carrying a fair amount of gold.

About 64 tons of ore have recently been extracted from the above workings and stacked at the battery ready for treatment, and the party of men working the mine expect that the water making in the eastern shaft will, in the next few weeks, accumulate in sufficient quantity to enable them to treat a parcel of 150 tons of ore at least by the plant on the mine.

Two samples of lode material taken from the face of the E. drive show on assay that the iron veins contain best values.

No. 1 sample, taken for a width of 10ft., gave 19dwts. gold per ton.

No. 2, taken from various veins, gave 3ozs. 2dwts. gold per ton.

(11–10–11.)

Lady Mary Copper Mine.—This is a new mining venture, situated about 1½ miles E. of Angepena old Police Camp. A well-defined copper bearing formation traverses the block; it can be traced on the surface for a distance of 300ft., bearing E. and W. and dipping 60° N. In the open workings, 25ft. long and from 3ft. to 10ft. deep, the lode formation disclosed is well defined and consists of ferruginous quartz and decomposed slate with thick seams and bunches of high-grade copper ore, chiefly malachite and copper glance. A fair-sized pile of ore, which will not require much dressing before sending it to market, has already been obtained from these workings. Three samples taken for the full width of the lode (3ft.) gave on assay at the School of Mines—

No. 1. Bottom of cutting	10 per cent.	copper;	gold, nil.
No. 2. E. end	11 "	"	"
No. 3. W. end	15 "	"	"

This lode appears very promising in the present shallow workings, and an underlie shaft should be sunk in it to test it at greater depth. (5–7–11.)

Lykke Viking Gold Mine, Teetulpa, formerly Scotchman and Ironclad (*vide* Record, page 267, and Reviews Nos. 11 and 14).—The underlie shaft started on the property has been continued to a depth of 172ft. from the surface and about 15ft. below water level. The water making at present in the shaft is about 1,000galls. per hour. This quantity is more than can be handled with the present appliances, and further sinking of the shaft at present has to be suspended.

An irregular lode formation is disclosed in the shaft, varying in width from 1ft. to 3ft., consisting chiefly of ferruginous quartz and iron pyrites, carrying a little gold.

Prospecting is carried on at several points on the property and promising reefs of various widths, consisting of quartz and iron carrying gold, are disclosed in the workings. A fair quantity of the ore obtained has been treated by the small rapid crushing mill on the mine. (9–10–11.)

Miltalie Copper and Silver-lead Mine (*vide* Review No. 12).—Situated in the hundred of Miltalie, 17 miles N.W. from Franklin Harbor. The property consists of 1,120 acres freehold, and a syndicate recently obtained an option over the whole area for the purpose of carrying on extensive mining operations.

The principal workings are situated on the top of a small hill 60ft. above the plain, where two shafts have been sunk, partly vertical and partly on the underlie of the lode, and one vertical shaft sunk on the dip side or hanging-wall country to a depth of 120ft. The whole of the workings have recently been unwatered, preparatory to commencing operations at the lower levels should the ore body prove to contain payable values.

Vertical Shaft, Old Workings.—At the 91ft. level a crosscut has been extended E. for a total distance of 40ft. At a point 25ft. in the crosscut a small vein of pyrites was intersected; a drive S. on the vein has been carried in 22ft., the vein along it being from 2in. to 3in. thick, and a sample taken from the face and back of the drive gave no value on assay. At a point 13ft. from the shaft in the crosscut, a vein of decomposed rock and quartz 4in. to 5in. wide, which appears to be the downward continuation of the main lode, was intersected. From the crosscut on the course of the lode N. a drive has been carried in a total distance of 88ft. (or within 6ft. of the whip shaft, but 26ft. below the bottom of the same); the formation along the drive consists of decomposed rock 4in. to 8in. wide, carrying lead ore. Sample taken from various points along the drive gave on assay 9·4 per cent. lead and 6dwts. of silver. At a point 47ft. N. from the crosscut in the drive a winze has been sunk to a depth of 17ft. The formation is about the same width as that in the drive, and carries lead ore. A sample taken from the bottom of the winze gave 3·2 per cent. lead and a trace of copper. A winze has been sunk from the 74ft. level and holed through to the bottom drive; at a point 34ft. N. from the crosscut the seam sunk on is from 3in. to 5in. wide, carrying lead ores, chiefly galena and cerussite. Sample taken of the ore from the vein near the top of the winze assayed 43·6 per cent. lead and 1oz. of silver per ton.

The Whip Shaft.—Situated about 94ft. N. from the main shaft, has been sunk 34ft. vertical and 28ft. on the underlie of the lode. From the bottom of the shaft a drive has been extended N. 12ft. in the lode; at that point a fault bearing E. and W., dipping N., appears to have cut off the ore body; but so far no work has been done N. of this fault to prove to what extent it has displaced or disturbed the ore body in that direction S. from the bottom of the shaft the lode has been operated on for a length of about 45ft., or to within a few feet of the winze, where it appears to pinch small on a smooth wall crossing the formation and dipping N. The formation disclosed in the N. and S. drives in this shaft is from 3ft. to 4ft. wide and carries nice pockets and seams of galena. Sample taken from the lode at the bottom of the shaft gave 40·8 per cent. lead and 1oz. of silver per ton. A sample taken from the bottom of the drive S. of the shaft gave 25·8 per cent. lead and 10dwts. of silver per ton. From the 62ft. level, up to within 10ft. of the surface, the ore body has been stoped out for a length of 50ft., with the exception of small pillars left in places to support the ground and to keep the workings safe.

The shoot of ore so far disclosed in the mine, judging from what can be seen in the limited workings, is from 45ft. to 50ft. long, with a N. dip, and shows to be going down in the vicinity of the Whip shaft. To further prove the extent and value

of this ore body at greater depth the best plan would be to continue down the Whip shaft, and drive in the lode at the 91ft. level. The prospects in the deepest workings from the vertical shaft are rather discouraging at present, the formation being small and of low grade; but it is quite possible that at greater depth the lode may improve both in size and value. Five samples taken of the lode formation in the upper levels gave on assay—

No. 1. From 19ft. level 10 % lead, 0·5 % copper, 14dwts. silver.
No. 2. " 37ft. " 13·1 % " 1·1 % " 16dwts. "
No. 3. " 37ft. " 23 % " 0·4 % " 16dwts. "
No. 4. " 37ft. " 0·2 % " nil " nil " } S. end of workings, E. crosscut.
No. 5. " 37ft. " nil " nil " nil " }

Samples taken from ore dumps on surface—

No. 1. Ore dump about 5 tons, 28·9 % lead, 3·0 % copper, 16dwts. silver.
No. 2. " " 10 " 40·1 % " 4·7 % " 1oz. 6dwts. silver.
No. 3. " " 21 " 19·1 % " 1·8 % " 14dwts. silver.
No. 4. Material from bottom of vertical shaft, nil.
No. 5. Graphite schist outcrop, 1 mile from main workings, 28 % graphite.
No. 6. Ore dump, iron shaft 50 chains from main workings, no value.

(22–8–11.)

New Mount Grainger and Medora Gold Mine (*vide* Record, page 250, and Reviews Nos. 8, 9, 13, and 14).—The sinking of the main shaft has been completed to a depth of 333ft., runners put in and the cage working to the bottom. At the 330ft. level two plats 12ft. by 10ft. by 8ft. have been cut out, preparatory to extending the W. crosscut to intersect the main lode at this level. A few feet above the bottom of the plat in the pump chamber a large steam pump has been placed in position and is working well, but the water in the shaft at present is not making in sufficient quantity to keep pumping operations going continuously. Judging from indications on the W. side of the shaft, it appears to me that by crosscutting in that direction a good supply of water would be obtained.

The Medora workings have been cleaned out and a start made at the 114ft. level to drive N. in the main lode.

Jones's vertical shaft, on the E. lode, has been sunk to a total depth of 120ft.; at the 66ft. level a crosscut has been carried in S. 20° W. for a distance of 36ft.; at a point 27ft. in from the shaft a drive has been extended 20ft. in a N.W. direction, in the face of which a large body of slate, traversed by leaders of quartz and iron veins carrying rich gold is disclosed. Operations on this ore body are in progress, and large quantities of high-grade ore are obtained from the workings. Samples taken proved on assay that some of the veins carry rich gold—

No. 1. Bottom of the drive, gave 44ozs. 17dwts. gold and 16dwts. silver
No. 2. N.E. side of drive, gave 2ozs. 8dwts. gold and 3dwts. silver.
No. 3. N.W. side and roof 6ft., gave 1oz. gold.
No. 4. E. side near shaft (slate only), trace of gold.
No. 5. Medora, N. drive, 1dwt. gold.
No. 6. " W. side of drive, 3dwts. gold.

The crushing mill and machinery on the mine have been overhauled and put in order, and at the time of my visit everything was working well, operating on ore from Jones's and Medora workings. On the side of the hill, about 20ft. above the mill, a large cement tank of 24,500galls. capacity has been erected. The water from the mine is pumped direct into the tank, and by gravitation is conveyed in pipes to all parts of the plant. The prospects in the present workings are very encouraging, and with sufficient water to run the crushing mill regularly, great quantities of ore could be treated on the mine. (18–7–11.)

A further report states—At the 330ft. level in the main shaft the W. crosscut has been extended 50ft. At a point 16ft. in from the shaft the main lode was intersected

and proved to be 34ft. wide; this part of the workings was full of water at the time of my visit and could not be examined. The manager, however, informed me that a sample of the ore body taken at this level on assay gave 8dwts. 4grs. of gold per ton; this proves that the large formation traversing the property contains good values at the deepest level so far intersected in the mine.

At the 120ft. and 220ft. levels plats have been cut out and the crosscuts at each level have been extended through the formation, which at these levels is from 28ft. to 30ft. wide; drives have been extended on the course of the lode at both levels, and everything is in a fair way for stoping.

From the stope over the 120ft. level, 520 tons of ore have been extracted and treated, which gave a return of 219ozs. 19dwts. 6grs. smelted gold, worth £862 19s. 7d.

On the *Medora Lease*, about 600ft. S. from the Grainger main workings, a vertical shaft has been sunk to a depth of 200ft. At the 114ft. level a crosscut was put in for a distance of 24ft. in country rock; at that point the main Grainger formation was intersected and proved to be 28ft. wide. An underlie shaft sunk from the surface in the lode has now been connected with the 114ft. level, and about 200 tons of ore extracted from the workings were treated, yielding 182ozs. 6dwts. 23grs. of smelted gold, worth £694 9s. 9d.

The large lode formation from which the two parcels of ore mentioned above were extracted has been operated on at various points along the line of strike, proving the formation to continue for the whole length of the property, and to a depth in the main shaft of 330ft.

The ore channel disclosed in the various workings is from 25ft. to 30ft. wide, and the gold-bearing matrix is composed chiefly of argillaceous sandstone, quartz veins, quartzite, and iron veins, running irregularly throughout, in the various joints and fissures of which gold can be seen at times. The richest gold occurs in shoots associated with iron seams traversing the formation, some crossing and others parallel with the channel; and in operating on these shoots of ore before the plant was erected on the mine a considerable quantity of lower grade ore which would not pay to send away was stacked on the surface. Recently 881 tons, the largest portion of which was taken from discarded ore dumps, were treated by the battery on the mine and gave a return of 119ozs. 3dwts. of smelted gold.

Jones' Workings, Eastern Lode. — The workings on this part of the property consist of two shafts, one on the underlie and one vertical, sunk to a depth of 120ft. At the 45ft. level the workings from both shafts are connected, and the material from the underground stopes and drives is now hauled up the vertical. At the 66ft. level winze-sinking, stoping, and driving are in progress, and a large body of gold-bearing material is disclosed; but there are no walls yet showing, and the full width of the ore body cannot be determined. It consists chiefly of slates of the usual gold-bearing character, with small seams of iron and quartz carrying rich gold traversing it in all drections, some crossing and others parallel to the bedding. Some of the veins carry fairly coarse gold, and gold is also visible at times in the joints and cleavage of the slates. As stated in one of my previous reports on this mine, the auriferous belt of slate operated on in the above workings has every appearance of being continuous on the whole length of the property parallel with the Grainger formation, and probably other rich shoots of ore will be discovered along the line.

From the workings of Jones' shaft, E. lode, a total of 161 tons 11cwts. of ore treated at the Government Cyanide Works, Petersburg, gave a return of 458ozs. 17dwts. 14grs. of gold, worth £1,795 12s. 2d.

The 15-head crushing mill on the mine has been overhauled and put in working order, and the erection of a cyanide plant is in progress. The future prospects of this mine appear most promising, and now that a sufficient water supply is available in the main shaft for both the treatment plants, there is a reasonable chance for the mine to become a profitable one. (14–8–11.)

New Milo Gold Mine (*vide* Record, page 322, and Reviews Nos. 10, 11, and 14).—Situated at Wadnaminga. Work is carried on at present in the main underlie shaft. The W. drive at the 370ft. level is in a total distance of 85ft., and driving and stoping are in progress. The ore body disclosed in the workings consists chiefly of ferruginous quartz and claystone, 20in. to 30in. wide, carrying good gold.

Three samples taken from the faces of the drive and stopes for the full width of the lode on assay gave—No. 1. 4ozs. gold per ton; No. 2. 1oz. 6dwts. gold per ton; No. 3. 3ozs. 14dwts. gold per ton.

The development at this level is highly encouraging; the lode is well defined and likely to continue down, and prospects fully warrant the extension of the workings W. in order to prove that large portion of the property where, for a considerable distance, the lode is practically intact. This would open out the mine and make available a large block of ground for stoping, which should pay well if treated by a plant on the mine. (3–10–11.)

The Queen May Gold Mine.—Situated on the Mount Grainger field, adjoining the N. boundary line of the New Mount Grainger Mine. At the S. end of the property a fair amount of prospecting work has been done by open trenching to depths of from 1ft. to 3ft. Small specks of gold were obtained in the broken slates and alluvial deposit at various points along the surface, but so far the main ore body has not been discovered. Recently a vertical shaft 6ft. by 4ft. in the clear was started near the S. boundary and has been sunk to a depth of 56ft.; two small leaders of quartz 3in. to 6in. wide were passed through at 25ft. and 40ft. respectively, but neither of the leaders carried any value. With a view of further exploring this promising block crosscuts should be extended E. and W. from the bottom of the present shaft; these would have a fair chance of locating the continuation of the rich ore operated on in the adjoining mine. (19–7–11.)

Radium Hill Mine (*vide* Record, page 361, Reviews Nos. 10 and 14, and Bulletin *re* radio-active ores, October, 1911).—From No. 1 shaft driving S.W. at 60ft. level is in progress and the drive is in a total distance of 94ft.; this drive will be extended another 8ft., then a rise will be started and put through to the surface for ventilating purposes, and it will also make a block of ground 60ft. by 100ft. long available for stoping. The lode formation disclosed in the drive is from 4ft. to 5ft. wide, with seams and patches of ore containing yellow incrustation throughout. A large quantity of ore has been obtained from the above workings and stacked on the surface ready to be treated as soon as the erection of the concentrating plant is completed.

No. 3 shaft, situated about 712ft. N.E. from No. 1, has been sunk on the underlie of the lode to a depth of 66ft. The lode formation disclosed in the shaft is from 2ft. to 2ft. 6in. wide, carrying high percentage of uranium oxide.

On other parts of the property a considerable amount of prospecting work has been done to shallow depths on promising outcrops, disclosing formations from 2ft. to 3ft. wide. A mill for treating the ore has been landed on the mine, and consists of one Hornsby oil engine, 25-h.p., one Gates crusher and rolls, and a Magnetic separator. The erection of this plant is in progress, and when completed large quantities of lode material can be treated. (6–10–11.)

Radium Hill North.—Situated about 3 miles N. from the Radium Hill Mine. The principal work carried on at present is prospecting the various formations traversing the property with a view of discovering the continuation northward of the radium-bearing ore operated on in the adjoining property.

A fair amount of trenching work has been done, and a number of shallow pits sunk on the promising outcrops at various points on the block.

One shaft has been sunk on a magnetic iron lode to a depth of 15ft., at which depth the country appears to be much disturbed, and the vein of iron was cut off by an intrusive belt of micaceous schist.

There are indications of several formations traversing the property well worth prospecting to a reasonable depth, where possibly they may be found to contain higher percentages of uranium oxide.

Five samples of the lode material taken from the various workings were analysed at the School of Mines. Three of them were found to be composed of an intimate mixture of rutile and ilmenite, carrying uranium, vanadium, rare earths, &c., with biotite and quartz, yielding on analysis 1·3 per cent. uranium, and showed radio activity. The two other samples, composed of micaceous schist and a little copper, contained no uranium. (6–10–11.)

Radium South.—Situated S. of and adjoining the S. boundary of the Radium Hill Mine. Prospecting work is in progress at various points on the property. At one point in the shallow workings a lode formation is disclosd, bearing N. and S., dip E., and consists of black schist, grey rock with specks of iron through it.

About 2½ chains farther S. the outcrop of an iron formation 2ft. wide bears E. and W., and by its trend appears likely to intersect the continuation S. of the Radium Hill formation: both lodes should be further prospected along the line and to greater depths, when probably ores containing uranium oxide will be discovered. (6-10-11.)

Ruby Oxide Copper Mine.—Situated ½ mile from Mochatoona Springs. A large lode formation traverses the block, bearing E. and W., dipping N. 45°, with two well defined walls 4ft. apart. The workings are situated on the side of a hill 100ft. above the plain. Recently an underlie shaft was started in the lode and sunk to a depth of 10ft., and sinking is now in progress. The ore body disclosed is from 3ft. to 4ft. wide, and consists chiefly of iron, strongly impregnated with malachite and copper pyrites: it appears a very promising lode and likely to continue down to a great depth. Samples of the ore taken from the bottom of the shaft for a width of 2ft. gave on assay 14·4 per cent. copper; sample from dump of second-class ore on surface, 7·2 per cent.; sample of jigged ore, 14·6 per cent; sample from Peer Mahomet's new find, 12·2 per cent. copper, 1oz. 10dwts. gold, and 2ozs. 18dwts. silver. About one mile outside the boundary of this property a well defined bed of *black carbonaceous shale* 4ft. thick was recently discovered, but appears of no commercial value, as it contains too large a percentage of ash. Sample taken gave 92.42 per cent. ash. (7–7–11.)

The Dorothy Tin Show.—Situated about 4 miles E. from Willunga. Prospecting work has been done over a considerable area at different places on the property. The workings consist of a number of shallow holes and trenches, sunk to depths of from 1ft. to 5ft., in what appears to be the outcrop of a lode formation, composed of decomposed slates and ferruginous quartz veins 4in. to 8in. wide; but, as shown by the samples taken from the various workings, the formations so far discovered do not appear to contain any tin ore.

The country rocks traversing the property consist chiefly of clayslate, mica schist, and quartzite, overlain in the gullies and flats by a thick layer of alluvial deposit which contains a fair quantity of white quartz, tourmaline, and iron nodules.

Three samples taken of the alluvial deposit gave on assay, tin, nil; and gold, nil. Four samples taken from the various shallow holes in which it was said tin ore had been discovered gave, tin, nil: and gold, nil.

The country is auriferous and a fair quantity of gold has been obtained from several mines in the vicinity. This property is worth further prospecting work being done to prove other parts of the blocks. (24–10–11.)

Virginia Gold Mine (*vide* Record, page 323, and Review No. 14).—Situated at Wadnaminga. Since my last visit to this mine, No. 3 underlie shaft near the E. end of the old workings has been cleaned out, repaired, and put in good working order, and the work of cleaning out the drives at various levels, repairing necessary places and getting the stopes in working order is now in progress, preparatory to carrying on extensive operations as soon as the treatment plant has been erected on the mine.

The ore body disclosed along the drives and in the stopes at the various levels appears highly promising, and consists chiefly of ferruginous quartz with iron pyrites and iron veins carrying good gold, and varying from 9in. to 24in. wide.

Eight samples of the ore body taken at various levels in the workings prove by assay that the lode contains high values in gold for an extensive area—

No. 1. Face of stope, 70ft. level, lode 2ft., 4ozs. 10dwts. gold per ton.
No. 2. 6in. vein near roof, 3ozs. 8dwts. gold per ton.
No. 3. Face E. drive, 15in. wide, 2ozs. 16dwts. gold per ton.
No. 4. Side W. drive, 15in. wide, 80ft. level, 1oz. gold per ton
No. 5. Face W. drive, 40ft. from shaft, 1oz. 19dwts. gold per ton.
No. 6. Face of drive, 2ft. lode, 120ft. level, 1oz. 5dwts. gold per ton.
No. 7. Main shaft, 150ft. level, drive E. 38ft., 1oz. 4dwts. gold per ton.
No. 8. W. drive, 130ft. level, lode 12in. wide, 1oz. 1dwt. gold per ton.

(3–10–11.)

Uncle Tom Silver-lead Mine (*vide* Record, page 191, and Reviews Nos. 10 and 14).—Some prospecting work has been carried on here recently. About half a chain S. from the old workings an underlie shaft has been sunk to a depth of 7ft.; the vein of ore disclosed is 6in. wide, carrying nodules of lead ore.

Portions of the old workings have been cleaned out to a depth of about 10ft.; the formation consists of soft ferruginous material 2ft. wide, carrying nodules of galena. (7–10–11.)

Wandilta Copper Mine (*vide* Record, page 144, and Reviews Nos. 6 and 14).—Principal work in progress on the property is the sinking of the main vertical shaft, which is down a total depth of 255ft. At 235ft. level a lode formation was intersected, containing high-grade sulphide ore, but owing to the great inrush of water coming into the shaft from the new lode, the progress of sinking through the latter was considerably hindered for a time. A 6-in. auxiliary pump was installed in the N. chamber; this and the 12in. lift already at work were able to keep the water down, and further sinking was continued in the ore body to a depth of 248ft., where the footwall of the lode was intersected. At this point a large cavity had occurred in the formation, extending W. for a distance of 12ft.; this cavity has now been enlarged and extended W. for a further distance of 13ft., making a total distance of 23ft. across the formation: excellent sulphide ores are disclosed all through the matrix in this drive.

The formation in the present workings is well defined and appears to be bearing about N. 20° E., and dipping W. at an angle of 45°; the width of the lode at right angles to its underlie is from 15ft. to 16ft. and consists mainly of calcite and a little quartz thickly impregnated with seams and fairly large pockets of high-grade sulphide ore coated black, chiefly chalcocite and bornite, also a fair amount of molybdenite is disseminated through the whole formation. The bottom of the shaft at present is down 7ft. into the footwall country, in which patches of nice sulphide ore are showing.

The water in the shaft has ceased off and is now about the same in quantity as prior to intersecting the lode: the working of the auxiliary pump has been discontinued, the 12in. lift working at 6½ to 7 strokes per minute is quite sufficient to pump out the water making at present. Sinking of the main shaft from present depth will be continued down to 320ft. The large ore body cut in No. 5 bore hole at a depth of 319ft., which contained high-grade sulphide ore for a depth of 34ft., should be intersected in the shaft within the next 50ft. or 60ft. of sinking. At a depth of 300ft., the manager intends cutting out fairly large plats, with a view of opening out the mine, and carrying on extensive operations in both lodes at that level. Three samples taken from the lode at 248ft. level gave the following results on assay:—

No. 1. 38·1 % copper, 2dwts. gold, 1oz. 2dwts. silver per ton.
No. 2. 28·6 % " 2dwts. " 1oz. 2dwts. " "
No. 3. 49·2 % " 2dwts. " 1oz. 10dwts. " "

These samples were taken from various parts of the lode—not as bulk samples, but as showing the value of the various classes of ore it carried, which are well disseminated through the whole matrix.

In sinking through the formation exceedingly fine specimens of ore were obtained and have been stored at the Mines Office; these, I am sure, will compare favorably with the best sulphide ore hitherto discovered in this district. The various formations intersected in the shaft correspond in every way with those cut in the bore, but vary a little in width and values; the lode recently intersected in the shaft is wider and richer than it showed in the bore. The future prospects of this property are exceedingly promising, and when the mine has been opened out and operations carried on in the large ore bodies great quantities of copper should be produced. (31–8–11.)

Westward Ho! Gold Mine (*vide* Record, pages 244 and 247).—Principal work carried on at this mine consists of repairing the vertical shaft, situated about 375ft. S. from the old underlie workings, removing the pumping appliances from the latter and erecting the same in the vertical shaft, which is down a total depth of. 98ft. with 36ft. of water in the bottom. The manager informed me that a pyritic lode, 20ft. wide, carrying good gold, had been sunk through in the bottom of the shaft, and that as soon as the water has been pumped out a start will be made to drive both E. and W. in the lode to open out the mine on an extensive scale. (9–10–11.)

Coronation Wolfram Blocks (*vide* Review No. 14).—Situated 18 miles S. from Yankalilla, near Callawonga Creek. No. 1 working, started on a reef bearing N.W. and S.E., dip vertical, is 30ft. in length along the line of lode and from 7ft. to 8ft. deep; the lode disclosed is strong, and consists chiefly of ferruginous quartz 20in. to 24in. wide. About 180lbs. weight of high-grade wolfram was obtained from these workings. No work has been carried on here for some time and the sides of the trench have fallen in, covering the largest portion of the reef.

No. 2, open cut workings. Situated about 4 chains N. from No. 1. Work is in progress here in a large formation bearing N. and S., having a slight dip to the E. Operations have been carried on for a length of 120ft. along the line of lode and to a depth of from 4ft. to 16ft. The formation disclosed is fairly defined, and consists of decomposed argillaceous sandstone and ferruginous quartz 2ft. to 6ft. wide, containing isolated pockets and seams of wolfram. In the deepest part of the open cut (16ft.) a fair amount of wolfram is showing, associated with quartz and irregularly disseminated through the formation. The wolfram, so far as proved in the present limited workings, occurs in various sized pockets in the different parts of the formation, and unless the whole of the latter is taken out it is quite possible that a considerable quantity of the ore will remain undiscovered.

Five samples from the lode material in No. 2 workings gave on assay the following percentages of tungstic acid in the ore :—

		Tungstic Acid.
No. 1.	Sample from a depth of 15ft., lode 5ft.	2·84 %
No. 2.	" " " sorted ore	47·12 %
No. 3.	" " " dump of quartz	8·78 %
No. 4.	" " " dump of seconds	3·34 %
No. 5.	" " 16ft. vein of ore	66·0 %

About ¼ mile S. from No. 2, a fair amount of prospecting work to shallow levels has been done at various points on promising-looking quartz reefs; but, as shown by four samples taken and assayed, the reefs where operated on do not contain much value; three of the samples were nil, and one gave 3dwts. of gold per ton.

From No. 1 and 2 workings, one ton of wolfram had been obtained and marketed, and the money realised for same (I was told) paid for all the work done on the mine up to date. The developments so far on this property are encouraging, with fair prospects of wolfram continuing in the lode and the discovery of other valuable minerals in the locality. (26–10–11.)

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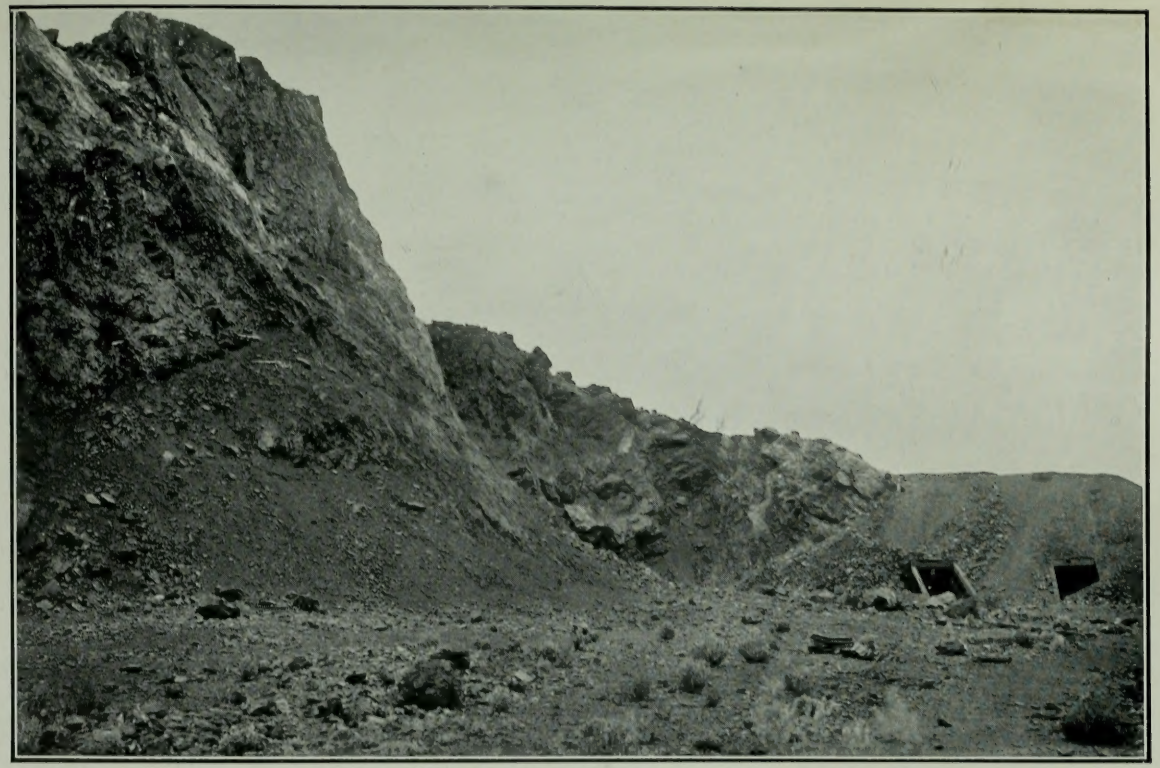

IRON ORE WORKINGS, IRON KNOB.

Photo. by Alfred Vaughan, Govt. Photolithographer.]